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Abstract:

This document contains the Dissemination, Liaison, Clustering and Standardization report of activities done by RiNG project during its first year and a half (1st July 2006 – 31st December 2007).

Keywords:

Dissemination, Liaison, Clustering, Standardization, Routing.

Revision History

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

Revision	Date	Description	Author (Organization)
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v1.1	25/05/2007	Document update and Standardization Report update	César Olvera (Consulintel) Alvaro Vives (Consulintel)
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v1.5	10/11/2008	Document changes according to review comments	Alvaro Vives (Consulintel)
v1.6	16/11/2008	Final Review	Jordi Palet (Consulintel)

Executive Summary

This deliverable contains a report of the different dissemination, liaison, clustering and standardization activities done by RiNG project during its first year and a half, which includes from 1st July 2006 to 31st December 2007.

Different sections describes the specific activities done by each partner, the most general activities done as a whole by the project as well future planned activities.

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1. INTRODUCTION

The WP0, in addition of being in charge of the project management, is also responsible for the attendance to events and organization of any dissemination and clustering activities and publications, acting as the project “think tank”, fostering and open to external contributors.

In addition, WP0 is responsible of the liaison with standard bodies. WP0 can be seen at the same time as the concentrator of the rest of the project activities, and as the executing interface for the support to the routing related activities, both by the project partners and other related activities/participants (Routing Cluster or “think thank”).

This deliverable is the first of three that aims to report on the dissemination, clustering/liaison and standardization activities carried out by the project.

2. DISSEMINATION, LIAISON, CLUSTERING AND STANDARDIZATION ACTIVITIES

The goal of the different RiNG activities can be summarized as follow:

- **Dissemination:** These activities have the goal of creating awareness regarding the different activities performed by the different work-packages and in general the work being developed by the project.
- **Liaison, Clustering:** As part of the linkage of the project with other activities and constituencies, several levels of liaisons are being considered by the project. Those include other projects, clusters, industry, standard organizations and other national/regional initiatives. The project expects lead to European consensus related to next generation routing aspects, including international participation and collaboration, in order to achieve a global impact. Towards that the project will form a "think thank" of experts, the "Routing Cluster", which will be coordinated by the project in order to gather the information from other activities and projects, with regular meetings in order to achieve consensus.
- **Standardization:** The results of RiNG are expected to impact in the standardization process, whenever required, by means of encouraging the partners and participants in the project itself and Routing Cluster to start this type of activities or to increase existing ones, with the overall result of increasing European contributions to standardization, and not just from the project participants.

This chapter 2 is subdivided as follow, section 2.1 describes the specific activities done by each partner, 2.2 describes the most general activities done as a whole by the project.

2.1 Specific Partners Activities

The RiNG partners have participated in different activities on dissemination, liaison, clustering and standardization during the first year. A summary of those is described below for each partner.

2.1.1 Consulintel

Consulintel has an extended experience and expertise in coordination, management, dissemination, publications, standardization and other related tasks due to its participation on other Spanish as well European IST and EUREKA projects.

In addition to that, Consulintel is involved in different IPv6 awareness and training activities, so the RiNG project work and results has been further disseminated and this is been considered as one more exploitation mean.

The project website has been the main dissemination tool of RiNG.

- Consulintel in collaboration with other partners designed and set up the project web site, which is up and running since M3 (September 2006), and it is accessible via IPv6 and IPv4 at http://www.ist-ring.eu.

- Along this, Consulintel prepared and set up the RiNG reading list of routing documents as a Wiki at http://wiki.ist-ring.eu. This Wiki, integrated into the project webpage, is being used to coordinate reading material and to state short synopses on their content. All the partners can edit and updates the contents and synopses using a password. Is remarkable that the RiNG reading list has been referenced as Background Readings in the Wiki of the IRTF Routing Research Group (http://www3.tools.ietf.org/group/irtf/trac/wiki/RoutingResearchGroup).
- Furthermore on dissemination efforts, the deliverables D0.1 "Project Presentation" and D0.2 "Project Website" have been made public trough project website.

Consulintel activities include a close follow up and contributions to network operators groups, RIRs, IETF, ETSI, IPv6 Forum, IPv6 Task Forces and others fora. There Consulintel has perform work and liaisons towards the RiNG Routing Cluster, which will support the work of different research groups, standardization organisms and bodies in charge of policy-making, with the aim to improve the networks of tomorrow.

As part of this, Consulintel has participated in several dissemination, training, and liaison/clustering activities held in key events and conferences such as:

- 66th IETF in Montreal, Canada.
- AfriNIC LIR + IPv6 Training in Johannesburg, South Africa.
- APNIC 22 in Kaohsiung, Taiwan.
- IETF Softwires Interim meeting in Barcelona, Spain.
- RIPE 53 in Amsterdam, Netherlands.
- NANOG 38 and ARIN XVIII in St. Louis, US.
- 67th IETF in San Diego, US.
- AfriNIC-5 in Port Louis, Mauritius.
- 27th ICANN meeting in Sao Paulo, Brazil.
- APRICOT 2007 and APNIC 23 in Bali, Indonesia.
- 68th IETF in Prague, Czech Republic.
- 28th ICANN meeting in Lisbon, Portugal.
- MENOG 1 in Manama, Bahrain.
- ARIN XIX in San Juan, Puerto Rico.
- AfriNIC-6 in Abuja, Nigeria.
- RIPE 54 in Tallinn, Estonia.
- LACNIC X and 5th FLIP-6 meeting in Margarita Island, Venezuela.
- AfriNIC LIR + IPv6 Training in Dar es Salaam, Tanzania.
- 29th ICANN meeting in San Juan, Puerto Rico.

Consulintel and other partners have prepared and carried out a RiNG workshop on Routing of 2 days. This workshop was held in Madrid in December 2007.

Regarding standardization activities, Consulintel tasks also include an active participation and contribution to IETF and other standardization fora, including the ETSI' Specialists Task Forces and the IPv6 Task Forces. The RiNG results have been applied into these contributions.

Within the IETF, the work done includes:

- Attendance to the IETF meetings participating in the WGs related to RiNG areas.
    - 66th IETF meeting held in Montreal, Canada, 9th-14th July 2006.

  - 67th IETF meeting held in San Diego, US, 5th-10th November 2006.
  - 68th IETF meeting held in Prague, Czech Republic, 18th-23rd March 2007. Here Consulintel attended to IRTF Routing Research Group meeting.
- Participation in discussions and drafting of the several IETF documents, the most prominent are:
  - Internet Draft, "Multihomed IPv6 prefix delegation, aggregation, and distribution" (draft-baker-v6ops-l3-multihoming-analysis-00).
  - Internet Draft, "Reserved IPv6 Interface Identifiers" (draft-krishnan-ipv6-reserved-iids-00).
  - Internet Draft, "An Internet Transition Plan" (draft-jcurran-v6transitionplan-00).
  - RFC4779, "ISP IPv6 Deployment Scenarios in Broadband Access Networks".
  - RFC4925, "Softwire Problem Statement".
- Research on current alternative approaches related to:
  - Multihoming.
  - SHIM6 and P-SHIM6
  - Provider captivity.
  - Traffic engineering.
  - Intra site stability.
  - Security.
  - Current status of routing and its protocols.
- Follow the Routing and Addressing Workshop (RAW), which the Internet Architecture Board (IAB) held in Amsterdam, Netherlands, 18th-19th October 2006. (See draft-iab-raws-report-02).
- Work in ULA policies at RIRs level and contribution to the discussion in the IETF ipv6 WG, working with the authors of the ULA-central ID.
- Research on the details of ISP and enterprises IPv6 renumbering. Consulintel is involved in an enterprise IPv6 renumbering and is needed to know the existents trends.

Furthermore, Consulintel has been working on the search and analysis on Routing Evolution. Consulintel has performed the identification of documents and information towards a Report on Routing Standardization Efforts. The aim is to summarize/describe the status of the standardization efforts worked by the Routing community on routing technologies, problems and possible designs to correct them. Up to now the identification is focused in on the outputs from different IETF and IRTF working/research groups.

Finally, Consulintel and other partners have been collaborated towards surveying Service Providers and End users (sites) requirements/trade-offs for routing.

2.1.2 TI

Telecom Italia, TI, has been a participant from the beginning, to the European Union Framework Programmes. In the 6th Framework Programme Telecom Italia Lab is involved in several Projects, which are a primary dissemination and exploitation mean.

TI has been working in RiNG dissemination activities such as:

- Contribution to the setup of the project web site http://www.ist-ring.eu.
- Reading and analysis work on the identified routing papers for the RiNG Reading List http://wiki.ist-ring.eu.

- Contribution to the RiNG dissemination activities such as D0.5.1. "1St Annual Dissemination, Clustering and Standardization Report".
- Attendance to RIPE 53 meeting in Amsterdam, Netherlands, 2nd-6th October 2006. Besides this event, there was held the 2nd project meeting.

Co-operation with manufacturers and other network providers (e.g. the Fireworks initiative among major European Telecom operators) is a fundamental part of Telecom Italia's activities, since it fosters potential synergies and know-how integration aimed at widening the company's interest range. These co-operations have been gained from RiNG activities. Also, these liaisons will be useful towards the RiNG Routing Cluster.

TI is founding member of the IPv6 Forum and the Italian IPv6 Task Force with the responsibility for promoting IPv6 deployment. Project achievements are been usefully shared also within these fora.

Finally, TI is active in several standardization bodies; among them can be recalled: ETSI, IETF, ITU-T, OIF, SIP Forum, UMTS Forum, W3C, 3G.IP, 3GPP. Co-operation with these bodies is a fundamental part of Telecom Italia's activities, and it has been reinforced with RiNG results in the routing area.

Within the IETF, the work done includes:

- Attendance to the IETF meetings with a special interest for working groups related to the project activities (IDR, SHIM6, SIDR and so on).
    - 66th IETF in Montreal, Canada.
    - 67th IETF in San Diego, US.
    - 68th IETF in Prague, Czech Republic.
- Identification and analysis of previous works and papers related to inter-domain routing requirements.
- Reading and analysis activity on papers related to inter-domain routing requirements and to the behavior of BGP protocol with respect to the identified requirements. This will be useful for RiNG deliverable D1.2 "Requirements from a network operator perspective".
- Analysis of the ongoing discussion in IETF and IRTF on BGP stability.
- Analysis of the ongoing discussion in IETF on the evolution of routing and addressing.

2.1.3 UC3M

University Carlos III, UC3M, is involved in multiple activities that are been gained from the exploitation and dissemination of the results of RiNG. In particular, UC3M participates in multiple conferences, presenting papers showing the results obtained in the projects and as reviewers/members of the different committees, fostering the work in the areas related to RiNG. Among the performed activities are:

- Attendance to RIPE 53 meeting in Amsterdam, Netherlands, 2nd-6th October 2006. Besides this event, there was held the 2nd project meeting.
- Attendance to the Wired and Wireless Internet Conference WWIC 2007 in Coimbra, Portugal, 21st-22nd May 2007, to present the paper "Fault Tolerant Scalable Support for Network Portability and Traffic Engineering", which containing results of the RiNG project.
- Attendance to the IEEE ICC07 - IEEE International Conference on Communications 2007 in Glasgow, UK, 24th-28th June 2007, to present the paper "An Architecture for Network Layer Privacy", which containing results of the RiNG project.

- Also, UC3M periodically organizes course about related technology, in order to disseminate the knowledge in the areas where the work is being performed.

UC3M is heavily involved in standardization work, mainly IETF, where the results of the project, susceptible to be standardized, have been presented. Up to now, the activities preformed include:

- Attendance to the IETF meetings, where UC3M attended to various meetings about routing and addressing research.
  - 66th IETF in Montreal, Canada.
    - Drafts presented and discussed in the shim6 WG meeting:
      - Internet Draft, "Level 3 multihoming shim protocol" (draft-ietf-shim6-proto-05).
      - Internet Draft, "Hash Based Addresses (HBA)" (draft-ietf-shim6-hba-01).
      - Internet Draft, "Applicability Statement for the Level 3 Multihoming Shim Protocol (Shim6)" (draft-ietf-shim6-applicability-01).
      - Internet Draft, "Default Locator-pair selection algorithm for the SHIM6 protocol" (draft-ietf-shim6-locator-pair-selection-00).
      - Internet Draft, "Socket Application Program Interface (API) for Multihoming Shim" (draft-sugimoto-multihome-shim-api-00).
    - Drafts discussed in the Internet Area meeting:
      - Internet Draft, "Updating RFC 3484 for multihoming support" (draft-bagnulo-rfc3484-update-00).
      - Internet Draft, "Support for Multiple Hash Algorithms in Cryptographically Generated Addresses (CGAs)" (draft-bagnulo-multiple-hash-cga-01).
    - Other presentations
      - Implementation summary at the shim6 WG.
  - 67th IETF in San Diego, US.
    - Drafts presented and discussed in the shim6 WG meeting:
      - Internet Draft "Level 3 multihoming shim protocol" (draft-ietf-shim6-proto-07).
      - Internet Draft, "Hash Based Addresses (HBA)" (draft-ietf-shim6-hba-02).
      - Internet Draft, "Applicability Statement for the Level 3 Multihoming Shim Protocol (Shim6)" (draft-ietf-shim6-applicability-02).
      - Internet Draft, "Default Locator-pair selection algorithm for the SHIM6 protocol" (draft-ietf-shim6-locator-pair-selection-01).
  - 68th IETF in Prague, Czech Republic.
    - Drafts related to the work done in RiNG presented and discussed in the meetings:
      - Internet Draft, "Proxy Shim6 (P-Shim6)" (draft-bagnulo-pshim6-00 and draft-bagnulo-pshim6-01). This draft is directly related to the deliverables due by the RiNG project.

- Internet Draft, "Preliminary LISP Threat Analysis" (draft-bagnulo-lisp-threat-00). This draft analyses an alternative Multihoming solution from the security perspective.
- Internet Draft, "IP Mobility and Multi-homing Interactions and Architectural Considerations" (draft-vidya-ip-mobility-multihoming-interactions-00). This draft analyzes the interaction between Multihoming and mobility solutions.

- Furthermore, new versions or new Internet Drafts have been done during the first year of RiNG.
  - shim6 Core Specifications
    - Internet-Draft, "Shim6: Level 3 Multihoming Shim Protocol for IPv6" (draft-ietf-shim6-proto-08).
    - Internet-Draft, "Failure Detection and Locator Pair Exploration Protocol for IPv6 Multihoming" (draft-ietf-shim6-failure-detection-06).
  - shim6 Informational
    - Internet-Draft, "Applicability Statement for the Level 3 Multihoming Shim Protocol (Shim6)" (draft-ietf-shim6-applicability-03).
  - shim6 Extensions
    - Internet-Draft, "Socket Application Program Interface (API) for Multihoming Shim" (draft-ietf-shim6-multihome-shim-api-02).
    - Internet Draft, "Hash Based Addresses (HBA)" (draft-ietf-shim6-hba-03).
  - Other Related Documents
    - RFC 4581 "Cryptographically Generated Addresses (CGA) Extension Field Format".
    - Internet-Draft, "Support for Multiple Hash Algorithms in Cryptographically Generated Addresses (CGAs)" (draft-bagnulo-multiple-hash-cga-03)
    - Internet-Draft, "Ingress filtering compatibility for IPv6 multihomed sites" (draft-ietf-shim6-ingress-filtering-00).
- Regarding the SHIM6 protocol design, the specific tasks performed include:
  - Work on the SHIM6 protocol design, including the SHIM6 protocol draft specification, HBA specification and other SHIM6 related documents.
  - Work on Proxy SHIM6 approach.
  - Work on the setup of the SHIM6 webpage (http://www.shim6.ist-ring.eu).
- Meeting in London, UK, 18th-19th February 2007, in order to discuss IETF work related to routing and addressing.
- Meeting with HIIT (Helsinki Institute for Information Technology) in Helsinki, Finland, 23rd February to 2nd March 2007, in order to discuss the HIP Multihoming Internet Draft.
- Preparation of the BOF proposal on CGA & SeND extensions for 69th IETF to be held in Chicago US, 22nd-27th July 2007.
- Publication of C. de Launois, M. Bagnulo, "The Paths Towards IPv6 Multihoming", IEEE Communications Surveys and Tutorials, Vol.8 No.2, 2006.
- Initial identification and analysis of previous works and papers related to Inter-domain routing requirements. As well initial work on studying alternative technologies has been started. In particular, the study of compact routing techniques and other proposals for improve Inter-domain routing. The main source of these documents is IETF, but also other sources, IEEE, IEE, Springer, etc., have been consulted.

2.1.4 CSC

CSC - Finnish Information Technology Centre for Science (CSC-Scientific Computing Ltd.), one of the largest supercomputing centers in the Northern Europe. CSC, operating FUNET network, has lots of operational experience with routing and IPv6 in particular. Its expertise and wide contributions at the IETF enables RiNG to have effective dissemination and standardization contribution for the use of thousands of routing experts worldwide.

The exploitation of RiNG results has been reinforce the CSC work done in a number of EU projects, e.g., HPCNTTN network, NedLib, REYNARD, 6NET, DEISA, EMBRACE, ENACTS etc. in areas such as high-performance computing, networking, routing, Grids, and so on.

CSC promotes its resources via collaborative research and development projects with academic and industrial partners across Finland and Europe. CSC also demonstrates its integrating activity with universities, research centers and companies by sharing resources, co-operating research activities, and establishing exchange of scientific ideas. Then RiNG results will be benefit the next generation routing scope of these activities.

As activities of dissemination, can be accounted the following:

- Attendance to RIPE 53 meeting in Amsterdam, Netherlands, 2nd-6th October 2006. Besides this event, there was held the 2nd project meeting.
- Presentation on Network performance issues in eVLBI and National Research Network meeting, Amsterdam, Netherlands, 15th November 2006.

In the other hand, as standardization activities within the IETF, the work done include:

- Attendance to the IETF meetings with a special interest for working groups related to the project activities.
    - 66th IETF in Montreal, Canada.
    - 68th IETF in Prague, Czech Republic. Special focus was done to routing and addressing parts (ROAP BOFs, IP directorate meeting and BOF preparation, etc.). Participation in the IRTF RRG (Routing Research Group) meeting.
- Remotely following 67th IETF in San Diego, US.
- Participated in IETF Last Call review of HIP base protocol and IETF Last Call review of 'ORCHID' protocol.
- Participation in preliminary discussions of “Multihomed IPv6 prefix delegation, aggregation, and distribution” (draft-baker-v6ops-l3-multihoming-analysis-00).
- Updating IETF documents:
    - Internet-Draft, “Overview of the Internet Multicast Routing Architecture” (draft-ietf-mboned-routingarch-07).
    - Internet-Draft, “The Generalized TTL Security Mechanism (GTSM)” (draft-ietf-rtgwg-rfc3682bis-08).
- Other routing related activities include:
    - Reading BGP and multihoming related research papers for background.
    - Reviewing and providing feedback on RRG design goals document, as well HIP DNS and applications documents.
    - Following and contributing to the IETF RAM, arch-discuss, and idr mailing lists on new routing architecture.
    - Following discussions on ULA-C and PI addressing/routing discussions.
    - Discussion with Jari Arkko on routing scalability.

- Going through APRICOT 2007 presentations on routing & addressing.
- Following RIPE, ARIN routing, mh-related mailing lists, NANOG list, and similar IETF lists such as sidr, idr, shim6, and so on.

2.1.5 INETTECH

Internet Technology Advisors, INETTECH, is an Internet consulting company located in Stockholm, Sweden that is specialized in consulting around network technologies, network design, application and management of RIR resources and network implementations. INETTECH has a long history with international Internet organizations such as RIPE and IETF. Finally is worth to mention that INETTECH also offers advance trainings in IPv6 and BGP-routing. The results of RiNG help to maintain INETTECH on the edge of the routing technologies.

With the INETTECH experience form operating really large carrier networks, early deployment work with new technologies as experience form operating one of the largest anycast distributions and one of European leading Internet Exchange points, the focus will be on providing feedback on current user requirements, deployability of new technologies and the working of future routing models and protocols.

INETTECH main activity in RiNG is related to liaisons and standardization work within IETF, including:

- Attendance to the IETF meetings
  - 66th IETF in Montreal, Canada. Especially working on the shim6 WG activities.
  - 67th IETF in San Diego, US, where INETTECH:
    - Chaired the IEPG meeting that included follow up presentations regarding both end-user needs and SP needs.
    - Chaired the v6ops WG meeting where short term solutions where discussed.
    - Chaired the shim6 WG meeting where one alternative long term approach was discussed.
    - Attended a follow up session held where discussions on how implementations of the SP requirements could be done. This work continued on mailing lists after the meeting.
  - 68th IETF in Prague, Czech Republic, where INETTECH:
    - Chaired the IEPG meeting that included discussions on observation studies for the growth of the routing table.
    - Chaired the v6ops meeting where short term solutions where discussed.
    - Attended the IRTF Routing Research Group meeting before the IETF meeting itself.

Other liaison, clustering and dissemination activities have been performed at:

- RIPE 53 meeting held in Amsterdam, Netherlands, 2nd-6th October 2006.
- IAB Routing and Addressing Workshop (RAW) held in Amsterdam, Netherlands, 18th-19th October 2006.

2.1.6 UNINETT

UNINETT is working together with researchers at Norwegian universities to perform research on Internet technologies, including routing issues.

UNINETT is also part of Q2S, which is a Norwegian Centre of Excellence at the Norwegian University of Science and Technology, where routing is one of the research areas. Results from RiNG will be disseminated to researchers in Norway through various forms of collaboration, including seminars.

As well other liaison and dissemination activities have been performed at RIPE 53 meeting held in Amsterdam, Netherlands, 2nd-6th October 2006.

The main function of UNINETT is as an internet operator for research and education institutions in Norway. To facilitate research and teaching of advanced technologies, UNINETT needs to have a good understanding of possible future technologies, and be an early deployer of new technology. Also, UNINETT also takes part in several international fora, including standardization in the IETF.

From one side, all those activities will reinforce the RiNG activities, in the other side UNINETT have been gained comprehensive results on next generation routing from RiNG results.

Within the IETF, the work done includes:

- Attendance to the IETF meetings participating in the WGs related to RiNG areas.
    - 66th IETF meeting held in Montreal, Canada, 9th-14th July 2006.
    - 67th IETF meeting held in San Diego, US, 5th-10th November 2006.
    - 68th IETF meeting held in Prague, Czech Republic, 18th-23rd March 2007. Participation to IRTF Routing Research Group meeting and other routing related sessions.
- Reading drafts and presentations on routing issues.
- Following and participating in the mailing lists of IETF routing and addressing and IRTF RRG.

2.1.7 Soton-ECS

The School of Electronics and Computer Science at the University of Southampton, Soton-ECS, has a track history of putting research into practice, and helping to enable technology transfer projects.

In terms of dissemination, Soton-ECS participates regularly in various international events and conferences, and expect to deliver papers to such events to further raise the awareness of the very topical issue of evolution of routing on the Internet.

Soton-ECS has also discussed with TERENA the possibility of holding a clustering meeting with IST routing oriented projects during a future TNC conference. A session during the event week should be possible.

One goal of RiNG is to analyze and keep track of the state of the art in standardization and policy, surveying the users and service providers, and propose further alternative related research and innovation strategies to address the challenges. With this on mind Soton-ECS has looked at some online tools that may be appropriate to use for online consultation/surveys of users. The Survey Monkey tool looks to be a good candidate.

Soton-ECS plans to contribute to the technical discussions in RiNG with an end-site perspective, complementing those in the project with backbone operation experience. Soton-ECS hopes to promote the solutions that evolve both within the academic community but also to help contribute to the standardization efforts in the IETF and other fora, where solutions to enable future routing growth to be realized are required.

Within the IETF, the work done includes:

- Attendance to the IETF meetings participating in the WGs related to RiNG areas.
    - 66th IETF meeting held in Montreal, Canada, 9th-14th July 2006. Soton-ECS discussed various aspects of the project with other project members who were present, and attended relevant WG meetings especially within the routing area to gain a feel for current trends in routing protocol development.
    - 67th IETF meeting held in San Diego, US, 5th-10th November 2006. Soton-ECS attended a wide variety of WG meetings related to routing. There was a significant discussion in a number of meetings (including IEPG, v6ops, RRG and the plenary) about the future of Internet routing. There is a growing acceptance of the urgency of the problem of future growth, and some initial consensus being formed on how a locator-identifier split solution may be realizable. It was clear from 67th IETF that RiNG is a very topical project and could play a very useful part in these discussions. Also, Soton-ECS has also followed the discussions since the 67th IETF on various IETF lists regarding split identifier/locator solutions, so we can contribute to deliverables in this area.
    - 68th IETF meeting held in Prague, Czech Republic, 18th-23rd March 2007. Participation to IRTF Routing Research Group meeting and other routing related sessions. After the meeting, the IETF routing area work on incremental changes to BGP (as discussed in the 68th IETF) are being followed with a view to documentation in A3.1 (BGP evolution).
- Soton-ECS has a specific interest on IPv6. In previous projects Soton-ECS work has helped guide vendors through practical experience, trials and standardization discussion. In the case of IPv6, end sites such as campuses do not have a proven Provider Independent address space solution at this time, and would thus be expected to renumber when changing providers. Since Soton-ECS have worked on IPv6 renumbering in the past, Soton-ECS is taking the issues raised there into discussions to understand the pros and cons of IPv6 features that might support renumbering, against the clearer benefit of PI address space. Evaluating the tradeoffs, and where the 'cost' is placed, will be of interest to all IPv6 end sites. Furthermore, Soton-ECS has reviewed its earlier work on network renumbering in light of A2.2 “Alternative approaches to avoid provider captivity”.
- Works toward the further understanding the current routing challenges and the data supporting the need for action. One focus of Soton-ECS work is on whether BGP can be modified or extended to support these changes, or whether new protocols will be required.
- Initial work has been done on A1.1 “Analysis of End-User requirements”, drawing material from IETF working groups and various other information sources and papers. From this material, an initial text towards a full D1.1 “Requirements from and end-user perspective” has been created, in the form of an extended document skeleton.
- Soton-ECS has been participating in various forums (mainly via mail lists) discussing future routing models, in particular those around the locator identifier split (e.g. LISP). The studies also include provider independent addressing approaches in IPv6 (ULAs) (for A2.2), and site renumbering in IPv6 (for A2.4).

- Soton-ECS has been participating in discussions focused on how BGP can be used or modified to enhance the existing routing protocol issues and ease the scalability issues (for A3.1).

2.2 General Project Activities

This section describes the main activities on dissemination, liaison, clustering and standardization done as a whole by the project during the first year.

2.2.1 Project Website

The main dissemination tool of the RiNG project is the project website.

Several domain names are been used, all of them pointing to the same virtual server:

- http://www.ist-ring.eu
- http://www.ist-ring.org
- http://www.ist-ring.net
- http://www.ist-ring.com

In all the cases, both IPv6 and IPv4 protocols are supported.

The project website is up and running since project month 3 (September 2006), and it has been continuously updated with the documents and outputs of the project.

Further details are described in RiNG's deliverable: D0.2 "Project Website".

2.2.2 Project News and Press Releases

A section of the web site is devoted to the project and related news.

The RiNG news are being shared with the well know IPv6 News section of the IPv6 Cluster / The IPv6 Portal (http://www.ipv6tf.org). In this way the RiNG news & events are been advertised in both RiNG and The IPv6 Portal web pages, reaching a broader audience and increasing the dissemination and awareness of RiNG activities.

2.2.3 Public Events

The project is participating not only in standardization and clustering meetings but also workshops, seminars and other dissemination activities, either organized by the project or third parties.

The project is actively participating in different events and conferences such as IST, TERENA, RIRs, network operators and IETF events among others. The project will also organize such activities if required and invite other related projects and initiatives to participate.

Those events offer possibilities for the project to actually disseminate some of the results and conclusions as well to perform a continuous liaison and clustering activities.

An example is the attendance and organization of different meetings besides IETF meetings. The project partners have attended to all IETF meetings held during the first year of the project.

2.2.4 Project Survey

One important objective of RiNG is to perform a survey to both ISP and user (site) on their requirements for routing in the next generation of networks.

The main project' survey will be prepared during the last months of 2007. The aim is to surveying as much as possible ISPs and users (sites) in several countries/regions around the world.

2.2.5 Conferences and Publications

The project is contributing to conferences, workshops and other events where the project results are been made public by means of papers, presentations and other contributions. The identification of further key events, in addition of IST, RIRs and IETF meetings, is under way.

The project will make a publication, in collaboration with other projects, initiatives and clusters, which will describe the main project activities, achievements and the work done. The target is to publish 5.000-10.000 copies in a high quality "booklet" format.

2.2.6 Clustering/Liaison Activities

As part of the linkage of the project with other activities and constituencies, several levels of liaisons are being considered by the project. Those include other projects, clusters, industry, standard organizations and other national/regional initiatives.

One of the main RiNG activities in this area is the open "Routing Cluster", where RiNG will support the work of different research groups, standardization organisms and bodies in charge of policy-making, with the aim to improve the networks of tomorrow. RiNG will provide operational support for the organization of open working meetings and other collaboration tools, such as an email exploder and web site.

Finally is important to mention that the participation of the RiNG expert partners in several research fora and projects carrying out activities related to the RiNG's aims brings added value to this project.

2.2.7 Standardization Activities

The RiNG project intends to achieve a high degree of contribution to standards, mainly to IETF.

This work has been already visible since the early stage of the project and is expected that other contributions will be available during all the project life.

RiNG scope is mainly related (but not limited to) to the following standardization activities:

- IETF
    - IPV6 –IP Version 6 Working Group.
    - V6OPS – IPv6 Operations Working Group.
    - Working Groups relevant to QoS, such as NSIS.
    - IDR – Inter Domain Routing Working Group.
    - GROW – Global Routing Operation Working Group.
    - RPSEC – Routing Protocol Requirements Working Group.
    - PCE – Path Computation Element Working Group.

    - MULTI6 – Site Multihoming in IPv6 Working Group.
    - SHIM6 – Site Multihoming by IPv6 Intermediation
    - IEPG – Internet Engineering and Planning Group.
    - MANET – Mobile Ad-hoc Networks Working Group.
    - RTWGW – Routing Area Working Group.
- IRTF
    - RRG – Routing Research Group.
    - FDR – Future Domain Routing.
    - RR-FS – Scalability Research Subgroup.
    - BGP Stability Routing Research Subgroup.
- Other Possible Fora
    - EOF – European Operators Forum.
    - NANOG – The North American Network Operators' Group.
    - SANOG – South Asia Network Operators Group.
    - MENOG - Middle East Network Operators Group
    - AFNOG - African Network Operators' Group
    - PacNOG: Pacific Network Operators Group
    - APIA – Asia & Pacific Internet Association.
    - RIRs (AfriNIC, APAN, ARIN, LACNIC, RIPE NCC)
    - ETSI

Up to now RiNG has participated in discussions related with several IETF Internet Drafts and some RFCs on areas such as Multihoming, SHIM6 and Hash Based Addresses (HBA). Additional work is also expected on IPv6 Renumbering.

One of the most relevant features of RiNG that provides added-value advantages is the participation in the project of people who have proven expertise in the routing area and who are involved actively in working groups of different standardization organizations. The know-how and the experience extracted from research activities in such standardization working groups will help to address the challenges that arise in next generation networks and they will contribute such that the networking technology advances, and thus more flexible, reliable and scalable products and services will be available for end users.

2.2.8 First Project Workshop

6DEPLOY organized the **Routing in Next Generation Workshop** held in Madrid, on University Carlos III premises, during 13th and 14th December 2008. The event is free to attend, with no fee for any attendee.

The event was principally aimed at PhD students working in the area of Internet routing architecture and protocols, but was open to submissions and presentations from any interested researchers. The aim of the workshop was to allow young researchers to present their work in a formal yet friendly environment to their peers and a selection of academic and industry experts from the routing research community. There were also expected two keynote speakers to take part in the event.

In the project web site all the relevant information was provided (http://www.ist-ring.org/index.php?page=workshops/ring_2007_workshop):

- How to access to the event live streaming and jabber session, for remote attendees.
- Call For Papers (CFP): information about the areas of interest for paper submission, deadlines, procedures, etc.
- Registration form: Although attendance was free, for logistic reasons people need to register in advance to attend.
- Logistics: Venue and travel information.
- Agenda: The final agenda, from which the presentations were made available, was:

13/12/2007	Thursday - Workshop Day 1	
12:00	Registration Open	
13:30	Introduction	
	The RiNG Project (Presentation) (Video)	Jordi Palet (Consulintel, Spain)
13:45-16:00	**Session A: Routing. What problem?**	
	Overview of routing behaviour Summary of the RRG/related discussions from Vancouver 70th IETF Meeting (Presentation) (Video)	Iljitsch van Beijnum (IMDEA/UC3M, Spain)
	Enterprise routing perspective (Presentation) (Video)	Tim Chown (University of Southampton, UK)
	Analysis of Trends in Routing (Presentation) (Video)	David Palma, Marilia Curado (University of Coimbra, Portugal)
	An Architecture for Metarouting (Presentatioin) (Video)	J.N. Billings, P.J. Taylor, T.G. Griffin (University of Cambridge, UK)
	Discussion Topic 1: Is the 'routing problem' well described? (Video)	
16:00-16:15	Coffee Break	
16:15-18:20	**Session B: Introducing the Locator/Identifier Split**	
	Overview of locator/identifier split (Presentation) (Video)	Stig Venaas (UNINETT, Norway)
	Six/One (Presentation) (Video)	Christian Vogt (Ericsson Research, Finland)
	Using DNS as an Access Protocol for Mapping Identifier (Presentation) (Video)	Oleg Ponomarev, Andrei Gurtov (HIIT, Finland)
	Discussion Topic 2: What are the research issues in loc/is split? (Video)	
18:20-18:30	Day 1 Closing Comments	
19:30	Evening Social Meal	Venue TBD

14/12/2007	Friday - Workshop Day 2	
08:30	Registration Open	
08:45-10:15	**Session C: Other Solutions**	
	Hierarchical Routing Architecture (Presentation) (Video)	Xiaohu Xu, Dayong Guo (Huawei Technologies, Germany)
	Implementing SHIM6 using the Linux XFRM framework (Presentation) (Video)	Sebastien Barre, Olivier Bonaventure (Universite Catholique de Louvain, Belgium)
	Distributed Traffic Filtering and Flow Information Propagatio (Presentation) (Video)	Robert Raazuk (Juniper Netwoks, Poland)
10:15-10:30	Coffee Break	
10:30-11:50	**Keynote Presentations**	
	LISP LISP-CONS LISP-ALT (Presentation) (Video)	David Meyer (Cisco Systems, US)
	NERD (Presentation) (Video)	Eliot Lear (Cisco Systems, Switzerland)

11:50-12:50	Session D: Open Discussion
	Starter Discussion Topics: - Do we have solutions that are incrementally deployable? - What elements of a solution are still missing? - How can research towards a solution be best facilitated?
12:50	Final Conclusions - Suggestions for Future Workshops
13:00	Close

3. FUTURE ACTIVITIES

The project will continue its activities with special focus on dissemination, liaison, clustering and standardization activities.

- The Project Website will be continually updated with documents, news, survey results, etc.
- The project is participating not only in standardization and clustering meetings but also workshops, seminars and other dissemination activities, either organized by the project or third parties.
- The project will continue actively participating in different meetings, conferences, workshops, and seminars within IST, TERENA, RIRs, network operators and IETF events among others.
- The project will also organize such activities if required and invite other related projects and initiatives to participate. As specific example, since the beginning of the project, it was identified that a workshop will be required together with WP3 “Routing Evolution” around M18 (December 2007) to identify the limitations of the BGP-based routing architecture and discuss proposals for a new inter-domain architecture. As consequence, RiNG organized a workshop as showed above.
- As was said before, the main project’ survey will be prepared during the last months of 2007. The aim is to surveying as much as possible ISPs and users (sites) in several countries/regions around the world. Is expected the survey will be completed by the end of July 2008.
- Also, as was said before, the project will make a publication, in collaboration with other projects, initiatives and clusters, which will describe the main project activities, achievements and the work done. The target is to publish 5.000-10.000 copies in a high quality “booklet” format.
- The project will be continue toward the "Routing Cluster", where RiNG will support the work of different research groups, standardization organisms and bodies in charge of policy-making, with the aim to improve the networks of tomorrow.
- RiNG will continue the contributions to standards, mainly to IETF. Several IETF Internet Drafts and some RFCs are expected to be produced. Also is expected the participation in the 70th, 71st, 72nd and beyond IETF meetings, the focus will be in the working groups related to IPv6, Routing, Mobile IPv6, SHIM6 and IPv6 Multihoming.
- The project will continue its contribution to conferences, workshops and other events where the project results could be made public by means of papers, presentations and other contributions. The identification of further key events, in addition of IST, RIRs and IETF meetings, is under way.
    - SANOG 10 and APNIC 24 in New Delhi, India.
    - AfriNIC 7 in Durban, South Africa.
    - NANOG 41 and ARIN XX in Albuquerque, US.
    - RIPE 55 in Amsterdam, Netherlands.
    - ICANN Meeting in Asia Pacific.
    - Internet Governance Forum 2007 in Rio de Janeiro, Brazil.
    - MENOG 2 in Doha, Qatar.
    - 70th IETF in Vancouver, Canada.
    - SANOG 11 in Dhaka, Bangladesh.

- APRICOT 2008 and APNIC 25 in Taipei, Taiwan.
- RIPE 56 in Cologne, Germany.
- AfNOG 2008 in Rabat, Morocco.
- SANOG 12 in Kathmandu, Nepal.
- SANOG 13 in Lahore, Pakistan.
- RIPE 57 in Dubai.

4. ROUTING STANDARDIZATION EFFORTS

RiNG project is aimed at coordinating/helping/guiding standardization efforts to follow the main ideas and conclusions reached by means of the project instruments: workshops, think tank, Routing Cluster, etc. To achieve this objective the project worked both in participating in standardization events and in collecting standardization information.

In the line of the latter is the effort of making a report on routing standardization efforts, to know which lines are being investigated, under which "umbrella" and by whom. In few words, this is a useful tool helping in the achievement of a community consensus.

Besides the report on routing standardization efforts is the Reading List (http://wiki.ist-ring.org/action.php?n=Wiki.Wiki) maintained in the project web site which includes both standardization and non-standardization documents.

4.1 Report on Routing Standardization Efforts

Among RiNG tasks is the search and analysis on Routing Evolution. As part of this, there have been performed the identification of documents and information towards a Report on Routing Standardization Efforts.

The aim of this report is to summarize/describe the status and results of the standardization efforts worked by the Routing community regarding routing technologies, problems and possible designs to correct them.

The report will include the most important information of the latest (up to April-May 2007) IETF Internet Drafts version according ftp://ftp.ietf.org/internet-drafts/all_id.txt, http://tools.ietf.org/wg/ and http://www.potaroo.net/ietf/all-ids/

Up to now the information is in a RiNG's data base, further statistics treatments and analysis of the content will be done later.

As well the report is finished, it will be available and updated in the RiNG web site. This initial report will be updated, from time to time, during the project progress, in order to include both interesting and new documents as well to reflect any new trend.

Up to now the identification has been focused in the outputs from different IETF working groups related to Routing issues and those interesting to RiNG goals. The considered working groups include:

1. Internet Area
    1.1. (shim6) Site Multihoming by IPv6 Intermediation
2. Operations and Management Area
    2.1. (grow) Global Routing Operations
    2.2. (multi6) Site Multihoming in IPv6
3. Routing Area
    3.1. (bfd) Bidirectional Forwarding Detection
    3.2. (ccamp) Common Control and Measurement Plane
    3.3. (forces) Forwarding and Control Element Separation

3.4. (idr) Inter-Domain Routing
3.5. (isis) IS-IS for IP Internets
3.6. (l1vpn) Layer 1 Virtual Private Networks
3.7. (manet) Mobile Ad-hoc Networks
3.8. (mpls) Multiprotocol Label Switching
3.9. (ospf) Open Shortest Path First IGP
3.10. (pce) Path Computation Element
3.11. (pim) Protocol Independent Multicast
3.12. (rpsec) Routing Protocol Security Requirements
3.13. (rtgwg) Routing Area Working Group
3.14. (sidr) Secure Inter-Domain Routing
3.15. (vrrp) Virtual Router Redundancy Protocol

5. SUMMARY AND CONCLUSIONS

This deliverable contains a report of the different the dissemination, liaison, clustering and standardization activities done by RiNG project during its first year (1st July 2006 – 30th June 2007). The Routing Workshop organized by the project on December 2007 is also included for completeness and because of its relevance.

Different sections of the deliverable describes the activities done by each partner, the activities done as a whole by the project, as well an overview table of all main activities and documents done. The future planned activities are also included.

An initial overview of the Report on Routing Standardization Efforts is also included. Is expected this report will be updated, from time to time, during the project progress, in order to include both interesting and new documents as well to reflect any new trend.