PSIRP
Publish-Subscribe Internet Routing Paradigm
FP7-INFSO-IST-216173

DELIVERABLE D5.4

Dissemination and Exploitation Report

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Authors	Hannu Flinck (NSNF) (ed.), Arto Karila (HIIT), Sasu Tarkoma (HIIT), Dirk Trossen (BT), George Xylomenos (AUEB), Mikko Särelä (LMF), Janne Riihijärvi (RWTH),
Responsible of the deliverable	Hannu Flinck Phone: +358504839522 Email: hannu.flinck@nsn.com
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1 Introduction

The PSIRP project has set out to re-examine some of the crucial fundamentals of the current Internet, leading to the outline, specification and early implementation of a possible future of the current Internet – a future that focuses on information only at the networking layer. Engagement with the wider community, that includes research as well as commercial community, is crucial to spread the ideas, the thinking and the results of our work.

This report documents our dissemination activities during the period of October 2008 to August 2009. It can be seen from these activities that our results of this period have been presented and discussed in 21 external dissemination events as well as they have been published in 12 scientific publications including one in SIGCOMM2009 and two in ReArch´08/SIGCOMM2008. In addition, the project has currently 3 accepted publications and 6 submissions pending acceptance.

In addition to publications in major conferences, the project employs technical reports on major work items (available at http://www.psirp.org) as a means to engage with the wider community. Furthermore, we engage with various international research projects in the space and are involved in a variety of activities, which will be outlined in this deliverable.

Last but not the least first code release of the PSIRP framework implementation took in place in June 2009 under the GPLv2 and BSD licenses. The plans for exploitation of the project results have been further refined both for the academic part as well as for the industry engagement.

2 IST concentration and consultation

The project was present at the FP7 Future Networks Concertation Meeting in Brussels, 17 February 2009 where the project presentation [1] was given by Arto Karila and discussions with other projects in the cluster were arranged. Furthermore, the project was presented in the Future Internet Assembly, Prague from 11th to 13th of May 2009 by Arto Karila in a panel discussion (with a project presentation). A short project statement in the socio-economic session was also presented.

3 Engagement with Individual European Projects

PSIRP has engaged with a variety of individual research projects, which will be outlined in the following section.

3.1 Future Internet program of ICT SHOK

The Finnish national Future Internet programme has the mission *"To combine efforts of Finnish companies and academia to make a significant contribution towards developing the Future Internet technology and ecology as a platform for innovation, especially focusing on network and information governance and leveraging mobility as a key source of competitiveness and global added value"*. [2]

The pub/sub work of PSIRP project fits well into the scope of the Finnish Future Internet (FI) program. The PSIRP framework will be used as part of the upcoming studies in the Information Networking work of the FI program that addresses three fundamentals shared with the PSIRP project: *storage*, *dissemination*, and *accessing* of information. For this purpose, LMF has written a white paper for The Finnish national Future Internet programme called "Publish/Subscribe Inter-networking in PSIRP - Framework for ICT SHOK FI" [9]. In addition, the Finnish national Future Internet programme has adopted the published PSIRP Blackhawk pub/sub prototype (see the section of Open Source code release, section 6) and will continue its development. One target in the project is to release the developed code and merge it with the PSIRP prototype.

3.2 Euro-NF NoE

AUEB-RC is a partner of the FP7 Network of Excellence "Euro-NF: Anticipating the Network of the Future - From Theory to Design" and Prof. Polyzos has been elected to the Euro-NF Steering Board. AUEB-RC researchers have repeatedly presented PSIRP ideas and results to Euro-NF meetings and the publish/subscribe and information-centric concepts have found their way to the Euro-NF vision document. PSIRP related publications have been accepted and presented at Euro-NF organized events, such as, for example, at the 1st and 2nd Euro-NF workshops "Future Internet Architecture-New Trends in Service and Networking Architectures," in Paris, France, November 2008 and Santander, Spain, June 2009, respectively.

3.3 EIFFEL

The EIFFEL think tank [4] is a group of individual and renowned Internet researchers that meet at the invitation of the EIFFEL support action, an EU-funded initiative. The vision and work of PSIRP was presented by Dirk Trossen (BT) at the first EIFFEL think tank meeting in Frankfurt in 2008. Current work at the open FIpedia website (http://fipedia.org/fipedia) touches many of the points that PSIRP has been making during its work, e.g., disagreements on the position of privacy, the issue of value in architectures, the longevity of architectures. Input from PSRIP happens through EIFFEL think tank members that are also part of the PSIRP project, most notably Prof. Polyzos, Prof. Mahonen, Dirk Trossen and Bob Briscoe.

3.4 OneLab2

Onelab2 [5] is an EU-funded research project, establishing and extending Planetlab-based research facilities in Europe. One of its workpackages is dedicated to the content-related extensions that might require support and integration into a wider research platform. PSIRP, as an information-centric project, is a dedicated 'customer' project to Onelab2, i.e., its requirements, results and thinking directly feed into the technical platform solutions that are supposed to be developed in Onelab2.

Direct consultations between PSIRP and Onelab2 were held, for instance, to define requirements for PSIRP experiments on a European research platform such as Onelab2. In particular, the requirements for implementing the PSIRP forwarding solution based on Bloom filters [6] were provided to Onelab2. PSIRP and Onelab2 also created a joined technical report [7] which outlines requirements and conceptual solutions for a framework to evaluate inter-domain networking solutions such as the rendezvous solution of PSIRP [6].

4 Engagement with International Initiatives, Projects and Universities

The PSIRP project has also engaged with a variety of international activities and universities, which will be presented in the following sections.

4.1 Essex University (UK)

PSIRP functionality has been integrated with the local campus infrastructure at Essex University, located at the edge of Colchester (UK). The university's facilities hold about 2500 students in their dorms, with access to their infrastructure. The wireless coverage has recently, in June 2009, been extended to full campus coverage with a single SSID. The PSIRP functionality is based on the latest release of the PSIRP node architecture (BlackHawk). See more about the BT-Essex network test bed and its PSIRP support in D4.4 [3].

The PSIPR infrastructure of the BT-Essex test bed can be gradually expanded for our testing purposes for the viability of the overall proposition of the project. Apart from the apparent demonstration potential of such networked setup, serving our dissemination and demonstration, the test bed will also serve evaluation purposes. For instance, real network load performance experiments can be conducted for evaluating (a) end node architecture performance and (b) forwarding node performance.

4.2 University of Campinas

The co-operation with the University of Campinas (UniCamp) has been productive. Unicamp has been working with creation and execution of test cases involving the PSIRP prototype. Some test cases used in the prototype evaluation include function testing, stress testing and user testing. As a result, some bugs in PSIRP prototype were found and corrected by the implementation team.

Unicamp has also implemented a plug-in for the Firefox to handle the PSIRP protocol in the web browser. The main goal of the plug-in is to provide a user-friendly interface to access the PSIRP prototype through the web-browser. As a result, users can directly insert the SId/RId pair in the address bar and browse the publication from the web browser.

One common research topic has been design and evaluation of a self-routing capabilities scheme as part of the pub/sub architecture to protect the forwarding plane from DDoS attacks. Building up on the in-packet Bloom filter based forwarding approach, extensions were proposed to create expirable forwarding identifiers bound to information flows.

Other dissemination activities of the PSIRP project within the Brazilian research community include a project presentation in the first national CPqD workshop on Future Internet architectures for an audience of approximately 40 persons from both academia and industry. At Unicamp, the PSIRP vision and the results achieved so far were presented as a guest lecture in a post graduate course on topics of next generation Internet. In addition, Christian Esteve from UniCamp gave a PSIRP related project presentation at TU Darmstadt in July.

4.4 Communications Futures Program (CFP) at MIT

PSIRP has been collaborating with the CFP initiative since its project start. As a co-chair of the Privacy and Security Working Group, Dirk Trossen has been steering discussions and work in this mixed industry and academia group towards crucial items for PSIRP, such as identity, trust and the vision of tussle networking (which is the foundation for the PSIRP vision [8]). Also, a joint paper was submitted on the argumentation for a new internetworking architecture such as provided by PSIRP.

5 Exploitation on Academic Level

PSIRP has also been exploited on academic level, as outlined in the following sections.

5.1 Athens University of Economics and Business—Research Centre

The Athens University of Economics and Business—Research Centre, and the Mobile Multimedia Laboratory (MMlab) in particular, perform leading research in areas aligned with the PSIRP project, such as multicasting, mobility, trust and security. AUEB-RC/MMlab is highly committed to PSIRP, with 3 faculty and 9 Ph.D. and M.Sc. and undergraduate students involved. The dissemination and exploitation results so far are presented in the following.

5.1.1 Dissemination of PSIRP results

AUEB-RC has already published seven papers in refereed workshops and conferences, in areas such as overlay multicast routing, mobility support, content distribution and cryptography. More conference papers are in preparation, while some of the published papers are being reworked for submission to journals. The MMlab Web site includes a separate page for PSIRP and its results, while all of our papers have been made available as technical reports from our Web site. We have also presented the project and its results in invited panel discussions at various events, as well as on our departmental Research Day with the goal of attracting additional graduate students to the PSIRP project.

As part of our work on overlay multicast routing and mobility support, we have made multiple extensions to the OMNeT++ simulator, so as to enhance its realism when simulating Internet scale topologies. A very significant extension is the first fully detailed packet level simulator for the BitTorrent protocol suite, which was developed with partial support from the project as a benchmark against which to assess the content distribution performance of the PSIRP architecture. All of our software is distributed with an open source license via a dedicated page citing the project's support, which is also referenced from the main OMNeT++ Web site. The software has already been downloaded many times and we expect it to gain additional visibility after we present a related paper in a forthcoming simulation conference.

5.1.2 Exploitation in teaching

The novel areas explored in the context of this project have already found their way into our graduate and undergraduate curricula. In particular, our undergraduate and graduate Distributed Systems courses have been considerably extended to address content based routing and content centric networking in general during the past academic year, while the publish / subscribe communication paradigm will be introduced this year. Specifically, the reading lists for both courses include the background material required to understand the PSIRP concepts, class projects have been created to address content distribution over new communication paradigms, and graduate students will be expected to present PSIRP related papers in-class. Changes have also been made to our mobile and wireless communications and multimedia technology and communications courses at the undergraduate and graduate levels, to expose students to some aspects of PSIRP. Three M.Sc. students have completed theses that are related to PSIRP, and four more are starting on PSIRP related subjects this year. In addition, a new Ph.D. student was recruited to work on content distribution over the publish / subscribe paradigm, while we expect to fill two additional PSIRP related Ph.D. slots in the forthcoming months.

5.1.3 Exploitation in future research

Our involvement in PSIRP so far has considerably strengthened our competitiveness not only in new communication paradigms such as publish / subscribe, but also in distributed systems, and in particular in large scale content distribution, support for mobility, trust structures and publish / subscribe security. Our collaboration with the other project partners has also resulted

in the preparation of joint papers that can lead to longer term collaborations. We expect to use the expertise gained via PSIRP not only for the preparation of new project proposals that will directly spin off from PSIRP, but also in other research areas that we are working on, such as building trust relationships, network economics and spectrum sharing in emerging network architectures.

5.2 RWTH Aachen University

RWTH Aachen University and the Department of Wireless Networks are actively performing research funded both from public sources as well as directly by companies in the domains touched by PSIRP activities. Accordingly, our use of PSIRP results consists of dissemination activities both in refereed publication venues and other fora, application of the results in teaching and thesis work, and exploitation related to research. We shall discuss the progress and future plans for each of these in the following.

5.2.1 Dissemination activities

As an academic partner publication of research results is one of the key dissemination activities in relation to PSIRP. We are currently in the process of publishing first results from the network coding evaluation work carried out in the first half of the project, and have already received acceptance notification for a journal submission on the topic. We are also preparing a conference submission on work to be submitted to a major wireless networking conference in the imminent future. The focus of our implementation and evaluation work has recently shifted towards topology management solutions for publish-subscribe networks, and we expect to submit several manuscripts for appropriate conferences during the reminder of the project lifetime as well. Our intention is to release the topology management module as open source alongside the rest of the PSIRP prototype implementation, forming another major dissemination channel for our work.

5.2.2 Exploitation in teaching

Introduction of publish-subscribe networking and information-centric communications to our teaching activities is also progressing. Our existing course on "Ad Hoc Networks and Mobile Computing" has included this year topics related to content-centric networking, and we have introduced M.Sc. level project and thesis topics on implementation of a publish-subscribe communications systems on mobile platforms. This work is expected to start in the upcoming winter semester 2009/2010. The work in PSIRP is also directly exploited in the Ph.D. thesis work of two of our doctoral students, one of which directly focusing publish/subscribe-communications. We also expect the exploitation of the results to intensify further during the final year of the project especially in M.Sc. thesis work now that the prototype implementations are reaching a level of maturity, and networked prototyping is becoming possible.

5.2.3 Exploitation in future research

Using and further exploring the use of publish/subscribe communications in our research work is a key exploitation activity for RWTH. We have a number of ongoing and upcoming research projects in the domains of cognitive wireless networks and wireless sensing, both natural application areas for publish/subscribe. Our plans are to study, building directly on PSIRP foundation, the use of such alternative information dissemination techniques for, e.g., exchange of measurement data in cognitive networks and as foundations for alternative signaling protocols in the wireless control plane. We are also exploiting the PSIRP results in our industry collaboration projects, including a recently initiated industry project directly studying the usage scenarios the potential impact of publish/subscribe in large scale wireless and mobile networks.

5.3 TKK-HIIT

The Helsinki Institute for Information Technology (TKK-HIIT) is a joint research institute of the two leading universities in Finland: the University of Helsinki and the Helsinki University of Technology. TKK-HIIT is an inter-disciplinary research organization with ongoing work in many other research areas besides Future Internet, including Algorithmic Data Analysis, Network Society, and Probabilistic Adaptive Systems. We expect the paradigm shift represented by PSIRP to have an impact in also these areas and lead into interesting inter-disciplinary projects. During the project, the researchers of TKK-HIIT will publish their results in scientific conferences and journals. TKK-HIIT is also actively involved in cooperation with other researchers in nationally and internationally.

5.3.1 Dissemination activities

Dissemination activities have included a number of presentations at international events including at University of Oslo in Norway, and in Japan for professors and researchers from several universities. In addition to presentations, the dissemination activity has resulted in 3 submitted articles and 2 accepted/published articles. Research progress was also reported at the IST Summit 2009.

5.3.2 Exploitation in teaching

Many of the researchers of HIIT are also teaching at Helsinki University of Technology or the University of Helsinki. Seminars and special courses on pub/sub will be arranged. A socio-economic course is scheduled to start in September 2009 in a join collaboration with Dirk Trossen (BT) and a hands-on special course or seminar on pub/sub application is planned for the spring semester 2010. There are ongoing discussions with the University of Petrozavodsk (Karelia, Russian Federation) on organizing a graduate course on pub/sub applications in the spring of 2010, using the prototype produced at the PSIRP project as platform for hands-on work with pub/sub applications.

5.3.3 Exploitation in future research

We expect hands-on graduate courses and seminars in pub/sub to lead into a new paradigm for application-level programming. We also expect to gain more understanding on what applications pub/sub best renders itself to (and, on the other hand) where its use does not give clear advantage. We also expect to innovate some entirely new applications. The domain of pub/sub applications is a fruitful research area, where only little has been published so far.

5.4 IPP-BAS

The Institute for Parallel Processing in Bulgarian Academy of Sciences works in the areas of networking, distributed systems and Grids, parallel programming, high performance computations and signal processing. The dissemination and exploitation results are presented in the following.

5.4.1 Dissemination activities

A seminar devoted to PSIRP goals and facts is conducted in IPP-BAS. The target audience was comprised of network researchers, IT-specialists and university lecturers. Similar seminars are planned in academic institutions and university departments with related subjects. A separate ongoing topic for PSIRP is created in the specialized Internet forum of Bulgarian Research and Education Network (BREN). Project presentations were conducted during the regular technical meetings of network administrators, supporters and developers involved into BREN activities. Articles and presentations based on the project achievements are in preparation for submitting to the international conference “Automatics and Informatics'09” in Sofia this autumn.

5.4.2 Exploitation in teaching

An introduction to PSIRP project was included in the university course with subject “Global networks” in New Bulgarian University (NBU) at the end of the spring semester, 2009. One M.Sc. student is involved in the project.

5.4.3 Exploitation in future research

The work in future research will mainly concentrate on traffic and congestion control (TCC) in a PSIRP network and its implementation in the blackhawk prototype. Another area of interest is the creation of tools for building and capturing PSIRP packets, using libnet and pcap. Those tools can be used in the later evaluation and testing of PSIRP. Evaluation and testing will be pointed towards the transport model in PSIRP.

6 Open-source Code Releases

The Blackhawk publish/subscribe prototype (v0.1) for FreeBSD, developed in PSIRP WP3, was released publicly in June 2009. Its source code is published under the GPLv2 and BSD open source licenses, so that users and developers of the code can choose which one of these licenses they want to apply (according to the plan in deliverable D3.1). In addition to the source code (written in C and Python), a virtual machine image for easy trials has been put available for download.

The released prototype features a pub/sub-based kernel-integrated blackboard for efficient node-internal communication between applications. Furthermore, it extends this information-centric communication model to the network by providing simple local-area rendezvous and packet forwarding with zFilters.

The University of Campinas, MIT, Essex University, and of course all PSIRP project partners have users of the prototype. The prototype has been planned to be used and developed further in the finnish ICT SHOK project's Information Networking work package.

External developer support is arranged through a PSIRP developer wiki and a mailing list for the wider community. The wiki is accessible at **http://wiki.hiit.fi/display/psirpcode/Home**, and initially it will contain instructions for usage and configuration of the prototype, and for writing pub/sub applications for this platform. Additionally, the wiki can be a place to share other information and discuss development of the prototype, development of applications, as well as other issues. A wiki based support channel is easy to update quickly with new information, and also allows external contributions.

On the community's mailing list (psirp-code@hiit.fi), people from both inside and outside the PSIRP project can ask questions, provide assistance to each other, and discuss about development issues, among other things.

In addition to this, personal contacts between the original developers and new users have played an important role in arranging support. As the user base grows, a new public mailing list and a wiki have been planned. The need for community-based support is becoming more important as concrete application innovation starts to take place.

Additionally, a forwarding node prototype for NetFPGA was also released under GPLv2 and BSD licenses. Version 1.0 was released in April, and a small update, v1.1, in July. This prototype, written in Verilog, implements hardware-level zFilter-based forwarding. It was submitted as a contribution to the NetFPGA project at Standford University, and was presented at the NetFPGA Developers Workshop in August 2009 (see also Journal, Conference Publications and External Presentations section).

Last but not least, AUEB released the BitTorrent simulator to the OMNeT++ community.

7 Industry Engagement Workshop

The project is in the process of organizing an industry engagement workshop to be held on September 17th, 2009 in London. The objective for the workshop is to engage in a dialogue with industrial stakeholders in order to influence the adoption of PSIRP ideas but also to support the formulation of socio-economic impacts that a PSIRP deployment would have. For that, we intend to tap into the knowledge of the audience in order to formulate business models and socio-economic market evaluations by parameterizing existing and evolving models in this area.

This workshop forms a crucial part of the exploitation strategy for PSIRP. The target audience of the event are open minded strategy-level industrial representatives from service, content, manufacturer and ISP side. The targeted persons are technology savvy but closely related either to business development or strategy settings of the company. The ideal audience is crucial to mix the key mindshare creators of the communications industry with the potential new drivers for tomorrow (e.g., content creators ...).

Both vendors of the project have representation. From the operator community in addition to BT that is a partner of the project have invited FT/Orange, Telecom Italia, Teliasonera and Vodaphone. From the retail side, we have invited Tom Whitford from Tesco. The content side is represented by Stuart Porter, Martin Long (head of production) from CTVC ltd and through Carmen Mac Williams from Grassroots Arts Ltd. The speakers are recruited from within PSIRP.

The workshop will consist of three sessions. The workshop will have a common element, outlining the methodology used (briefly) and the current considerations on market and business model level. The second phase of the workshop will apply the methodology for a set of use cases in break-out groups, aiming at finding the most valuable parameters and input into the models. And finally a third session joins the input from the break-out groups

8 Journal, Conference Publications and External Presentations

The project has published the following scientific publications:

1. George Xylomenos (AUEB), Konstantinos Katsaros (AUEB), and Vasilios Kemerlis (AUEB), “Peer Assisted Content Distribution over Router Assisted Overlay Multicast”, Euro-NF Future Internet Architecture Workshop, November 2008.
2. Jarno Rajahalme, Mikko Särelä, Pekka Nikander, and Sasu Tarkoma, “Incentive-Compatible Caching and Peering in Data-Oriented Networks”, Re-Arch'08, www.sigcomm.org/co-next2008/rearch.html, December 2008.
3. Christian Esteve, Fabio Verdi, and Mauricio Magalhaes, “Towards a new generation of information-oriented Internetworking architectures”, Re-Arch'08, www.sigcomm.org/co-next2008/rearch.html, December 2008.
4. Konstantinos Katsaros (AUEB), Nikolaos Fotiou(AUEB), George Polyzos (AUEB), and George Xylomenos (AUEB), “Overlay multicast assisted mobility for future publish subscribe networks”, ICT Mobile Summit 2009, Santander, Spain, June 2009.
5. Andras Zahemszky (LMF), Christian Esteve (Unicamp), Andras Csaszar (ETH), and Pekka Nikander (LMF), “Exploring the Pub/Sub Routing&Forwarding Space”, ICC Workshop on the Network of The Future, Dresden, Germany, June 2009.
6. Jimmy Kjällman, “Attachment to a Native Publish/Subscribe Network”, ICC Workshop on the Network of The Future, Dresden, Germany, June 2009.
7. Konstantinos Katsaros (AUEB), Nikolaos Fotiou (AUEB), George Polyzos (AUEB), and George Xylomenos (AUEB), “Supporting Mobile Streaming Services in Future Publish/Subscribe Networks”, Wireless Telecommunications Symposium (WTS) 2009, Florida, USA, April 2009,
8. Konstantinos Katsaros (AUEB), Nikolaos Bartsotas (AUEB), and George Xylomenos (AUEB), “Router assisted overlay multicast”, NGI 2009, Aveiro, Portugal, July 2009.
9. Dmitrij Lagutin (HIIT) and Sasu Tarkoma (HIIT), “Forwarding challenges and solutions for a publish/subscribe network”, ICT Mobile Summit 2009, Santander, Spain, June 2009.
10. Petri Jokela, Andras Zahemszky, Christian Esteve, Somaya Arianfar, and Pekka Nikander, “LIPSIN: Line speed Publish/Subscribe Inter-Networking”, SIGCOMM'09, http://conferences.sigcomm.org/sigcomm/2009/, Barcelona, Spain, August 2009.
11. Jari Keinänen (LMF), Petri Jokela (LMF), and Kristian Slavov (LMF), “NetFPGA Implementation of zFilter based Forwarding”, NetFPGA Developers’ Workshop, CA, USA, August 2009.
12. Nikolaos Fotiou (AUEB), George C. Polyzos (AUEB), and Dirk Trossen (BT), “Illustrating a Publish-Subscribe Internet Architecture”, Future Internet Architectures: New Trends in Service Architectures (2nd Euro-NF Workshop), Santander, Spain, June 2009.

The following external presentations have been given since the previous dissemination report, D5.3:

1. Pekka Nikander (Ericsson), “Pure Publish/Subscribe Inter-networking”, MIT CFP Privacy & Security workshop, Cambridge, MA, USA, October 21, 2008. Audience ~20 persons.
2. Trossen, Dirk (BT), “Information-centric Internetworking”, MIT CSAIL seminar, Cambridge, MA, USA, October 22, 2008. Audience ~20 persons.
3. Esteve, Christian (Ericsson / Unicamp), “Information-Centric Inter-Networking: Insights from EU FP7 PSIRP”, Deutsche Telekom Labs, Darmstadt, Germany, October 24, 2008. Audience 8–10 persons.
4. Jarno Rajahalme, “Incentive-Compatible Caching and Peering in Data-Oriented Networks”, Preview of the ReArch'08 presentation, Otaniemi Future Internet Pizza, Espoo, Finland, November 19, 2008. Audience: ~40 researchers.
5. Xylomenos, George. AUEB), “Peer Assisted Content Distribution over Router Assisted Overlay Multicast”, Paris Telecom, EuroNF Future Internet Architecture Workshop, Paris, France, November 21, 2008. Audience: ~10 persons.
6. Särelä, Mikko (LMF), “Inter-domain Rendezvous”, Computer laboratory, University of Cambridge, UK, November 27, 2008. Audience: ~15 persons.
7. Jarno Rajahalme, “Incentive-Compatible Caching and Peering in Data-Oriented Networks”, Re-Arch'08, www.sigcomm.org/co-next2008/rearch.html, December 9, 2008. Audience: ~40 researchers.
8. Dirk Trossen (BT), “Design for the Future Internet”, Computer Science 2008, Undergraduate conference organized by University College London, UK, December 16 2008. Audience: ~35 persons.
9. Christian Esteve (Unicamp), “Information-Oriented Internetworking”, CPqD, Brazilian Workshop on Future Internet, April 16, 2009. Audience: ~60 researchers.
10. Jimmy Kjällman (LMF)and Petri Jokela (LMF), Publish/Subscribe Demo, TIVIT Results and Strategy Seminar, Finland, April 14, 2009.
11. George Polyzos (AUEB), “Supporting Mobile Streaming Services in Future Publish/Subscribe Networks”, WTS 2009, April 22, 2009.
12. Arto Karila (TKK-HIIT), “Publish-Subscribe Internet Routing Paradigm – PSIRP”, project presentation and participation in a panel discussion, Future Internet Assembly, Prague, May 11, 2009.
13. Arto Karila (TKK-HIIT), presentation of PSIRP project statement in the socio-economic session, Future Internet Assembly, Prague, May 12, 2009.
14. Arto Karila (TKK-HIIT), “Publish-Subscribe Internet Routing Paradigm – PSIRP”, AMICT 2009 Workshop, Petrozavodsk, Russia, May 19, 2009. Audience: ~30 Russian and Finnish researchers.
15. Jimmy Kjällman and Jari Keinänen (LMF), “Publish/Subscribe Prototype” (presentation and demo), Future Internet Pizza, Espoo, Finland, May 20, 2009.
16. Konstantinos Katsaros (AUEB), “Illustrating a Publish-Subscribe Internet Architecture”, Future Internet Architectures: New Trends in Service Architectures, 2nd Euro-NF Workshop 2009, June 9, 2009.
17. Konstantinos Katsaros (AUEB), “Overlay Multicast Assisted Mobility for Future Publish/Subscribe Networks”, ICT Mobile Summit 2009, Santander, Spain, June 10, 2009.

18. George Polyzos, “Towards a Mobile-friendly Internet Panel”, ICT Mobile Summit 2009, Santander, Spain, June 8-12, 2009.
19. Petri Jokela (LMF), “LIPSIN”, Sigcomm 09 presentation rehearsal with graduate students and researchers, Helsinki University of Technology (TKK), Finland, June 15, 2009. Audience: ~10 persons.
20. Pekka Nikander (LMF), “Pure Publish/Subscribe Inter-Networking”, Finnish ICT SHOK Future Internet Programme Phase 2 Kick-off, Tuusula, Finland, June 16 2009. Audience: ~100 researchers.
21. Konstantinos Katsaros (AUEB), “Router assisted overlay multicast”, 5th Euro-NGI Conference on Next Generation Internet Networks, July 1, 2009.
22. Dirk Trossen, “Information Networking - Bringing Sense To Future Systems”, Cambridge Wireless SIG event on Wireless Sensing, June 4, 2009. Audience: ~80 persons.
23. Dirk Trossen, “Two Sides of the Same Coin”, MIT Communications Futures Program: Value-Chain Dynamics WG meeting, July 30, 2009. Audience: ~15 persons.
24. Dirk Trossen, “From Interconnecting Machines to Interconnecting Information”, Keynote at Europecomm 2009, August 13, 2009. Audience: ~100 persons.

The following submitted papers have been accepted for publication:

1. Konstantinos Katsaros (AUEB), Vasileios P. Kemerlis (Columbia), Charilaos Stais. AUEB), and George Xylomenos. AUEB), “A BitTorrent Module for the OMNeT++ Simulator”, MASCOTS 2009, September 21-23, London, UK. Submitted on April 10 2009. Acceptance notification May 20 2009.
2. Dmitrij Lagutin (TKK-HIIT) and Sasu Tarkoma (TKK-HIIT), “Public Key Signatures and Lightweight Security Solutions in a Wireless Environment”, NEW2AN 2009, September 15-18. Accepted: June 10, 2009.
3. András Zahemszky, Somaya Arianfar, “Fast Reroute for Stateless Multicast”, RNDM '09. Submitted on June 25, 2009.

The following papers have been submitted for publication:

1. Teemu Rinta-aho (LMF), Somaya Arianfar (LMF), Jari Keinänen (LMF), Kristian Slavov (LMF), Dmitrij Lagutin (HIIT), Pekka Nikander (LMF), “ALPS: A Layerless Pub/Sub Stack”, 2009 USENIX Annual Technical Conference, San Diego USA, http://www.usenix.org/events/usenix09/. Submitted on January 9, 2009.
2. Dmitrij Lagutin, Sasu Tarkoma, Hannu H. Kari, “PLADO: Packet Level Authentication for Data-oriented Networks”, Infocom 2009, http://www.ieee-infocom.org/. Submitted on August 29, 2008.
3. Dmitrij Lagutin, Sasu Tarkoma, Hannu H. Kari, “Data-centric Rendezvous With Packet Level Authentication”, Globecomm 2009, http://www.ieee-globecom.org/. Submitted on March 31, 2009.
4. Jarno Rajahalme, Mikko Särelä, Kari Visala, and Janne Riihijärvi. “Inter-Domain Rendezvous Service Architecture”, CoNext'09. Submitted on June 20, 2009.
5. Dirk Trossen, Mikko Särelä, and Karen Sollins, “Arguments for a New Internetworking Architecture”, HotNets 2009. Submitted on July 24, 2009.
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