



Deliverable D5.2

Report on Trendsetting Activities

Release 1

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Executive summary

UniverSelf intends to become a trendsetter in the area of autonomic networking for future networks. To this end, the work package 5 of the project coordinates all the dissemination, promotion and standardisation activities aiming at ensuring a wide impact and take-up of the project's vision and outcomes.

The present document is an outcome of the four tasks constituting work package 5 of UniverSelf. It reports all the trendsetting activities, achieved during the first project year (from September 2010 to August 2011). It covers: publications, presentations, communication, project promotion, event organization (workshops, panels and special issues), liaisons and collaboration with other projects and standardization actions.

The main trendsetting achievements in year 1 of UniverSelf are:

- A total of 44 scientific publications: 35 published or accepted for publication, 9 submitted for review.
- Public release of 4 major technical reports (D2.1, D3.1, D3.3, D4.1) and 2 general project promotion publications: the project leaflet and a first press release.
- Set-up and maintenance of an active web presence, which is referenced by Wikipedia.
- Release of two of the first standards with contribution and influence from the UniverSelf project:
 - Y.3001 recommendation approved in June 2011 by the ITU-T plenary. This standard recommendation represents the first definition and agreement in any standardisation groups on future networks and is the first management standard based on “in-band management/network empowerment” approach.
 - AFI-0001 group specification approved in May 2011 by ETSI. This group specification defines scenarios, use cases and requirements for an autonomic and self-managing future Internet as developed by the ETSI AFI Industry Specification Group.
- Planning, monitoring of and participation in standardisation or pre-standardisation group meetings (7).
- Organisation and participation in relevant dissemination events and activities: workshops, special issues (6), events with European Commission support.
- Collaboration with other EU-funded projects and international research initiatives (11).
- Preparation and planning of open-source solutions for management of future networks: 2 platforms under development at UCL and INRIA.

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1 Introduction

UniverSelf intends to become a trendsetter in the area of autonomic networking and self-management for future networks. To this end, work package 5 of the project concentrates all the dissemination, promotion and standardization activities aiming at ensuring a wide impact and take-up of the project's vision and outcomes. The members of the UniverSelf consortium have strong links to all of the Future Internet constituencies and to relevant standardisation organisations; hence, the project, through work package 5, foresees to exploit these relations as much as possible. The main objectives are:

- To disseminate project results to project partners (to gain feedback and seed collaboration), to industry (to encourage take up of the technology) and to the wider community.
- To communicate with other related initiatives and Future Internet projects working in similar areas to ensure that achievements have a concrete impact.
- To build and establish community-wide understanding and acceptance of valuable project outcomes, regarding in particular certification and trust mechanisms for self-managing networks.
- To promote understanding and re-use of ideas developed in the project, by enabling easy access to project results.
- To drive high impact standardisation bodies (such as ETSI, IETF and 3GPP, among others) towards the adoption of UniverSelf's research approach and outcomes.
- To create momentum and favourable conditions for industry buy-in of the solutions developed by UniverSelf.

The D5.1 deliverable (not public), which has been released previously, aimed at detailing the project plans in terms of dissemination and exploitation. It covered the following trendsetting activities: presentation of the project in the web and in the public media, the scientific dissemination of the project results, their standardisation, trust and trendsetting activities, as well as the plans for the exploitation of the project results by academic and industrial partners.

Then, the present document, which is an outcome of the four tasks constituting work package 5 of UniverSelf, reports all the trendsetting activities that have been actually achieved during the first project year (from September 2010 to August 2011). These activities are detailed in section 2 and span the following topics: publications, presentations, communication, project promotion, event organization (workshops, panels and special issues), liaisons/collaboration with other projects and standardization actions.

This document will be updated annually to highlight the latest project achievements in terms of trendsetting activities.

2 Trendsetting Activities

The trendsetting activities are be divided into seven categories that will be described in the following sections:

- Web-based presentations of the project and its activities (section 2.1),
- Dissemination of the project achievements through public documents (section 2.2),
- Presentation of the project and its results in the public media (section 2.3),
- Scientific dissemination by means of:
 - Publication of results in conferences and journals (section 2.4),
 - Co-organising or participating in relevant dissemination events (section 2.5),
 - Participating in events with support by the European Commission (section 2.6),
- Preparation and planning of open-source management solutions for future networks (section 2.7)
- Involvement in collaboration with other FP7 projects (section 2.8),
- Trust and trend setting activities (section 2.9),
- Involvement in standardisation activities and fora (section 2.10).

2.1 Web presence

The screenshot shows the homepage of the UniverSelf public website. At the top left is the UniverSelf logo with a 'Home' button. To the right are links for RSS, Contact us, and Login, along with a search box. Below the logo is the tagline 'In Self-* We Trust' and a navigation bar with 'About UniverSelf', 'News', 'Dissemination', and 'Contact Us'. The main content area is divided into three columns:

- Left Column:** A sidebar menu with 'About UniverSelf' (sub-menu: About UniverSelf, Partners, Structure, Timeline, Leaflets, Liaisons), 'News', 'Highlights', and 'Dissemination'. Below it is a 'Tags' section with a list of project-related terms like 'Alcatel-Lucent Automation', 'autonomic Cluster Concertation', 'Future Internet', etc.
- Middle Column:** A section titled 'About UniverSelf' with a sub-heading 'UniverSelf, realizing autonomies for Future Networks'. It includes 'Project Details' with information such as 'FP7 Project Contract Number: 257513', 'Start Date: 01-09-2010', 'End Date: 31-08-2013', 'Project Total Cost: 16.6 million euro', 'EC Contribution/Funding: 10.5 million euro', 'Project Coordinator: Martin Vigoureux, Alcatel - Lucent Bell Labs France', and 'Technical Manager: Christian Destré, France Telecom SA'. Below this is a 'Main Objectives' section with a paragraph of text and a list of four major goals.
- Right Column:** A 'News' section with three articles:
 - 'UniverSelf researchers world-wide in the news' (Wed, 2011-02-16)
 - 'IEEE Network Magazine special issue' (Wed, 2011-02-02)
 - 'First UniverSelf Press Release is Online' (Thu, 2010-12-23)
 - 'Welcome to the new site!' (Thu, 2010-11-11)

Figure 1. Homepage of the UniverSelf public website (<http://www.univerself-project.eu/>).

UniverSelf operates an internal web site (groupware) that allows project partners to share results and to document the progress of the different work packages. In parallel to the internal web site, the project maintains the public website <http://www.univerself-project.eu/> where third parties can access publicly released documents, such as technical reports, open source packages, and press releases, as well as get informed about the latest project news and achievements, workshop and event announcements, etc. It is indeed regularly used to publish news about the project and partners' activities and it provides the list of accepted publications. Besides, The UniverSelf website offers the possibility to subscribe to an RSS feed. A screenshot of the website homepage is provided in Figure 1.

In order to increase the visibility and web presence of the project, UniverSelf and its public website are now referenced on the following Wikipedia pages:

- Autonomic Networking: http://en.wikipedia.org/wiki/Autonomic_Networking
- In-Network Management: http://en.wikipedia.org/wiki/In-network_management
- Future Internet: http://en.wikipedia.org/wiki/Future_Internet

Some statistics on the website frequentation are provided in Annex D and contain information on the number of visitors, page views, sources of traffic, and visitor profiles. The statistics have been extracted via Google Analytics reporting tool. An overview of the number of visitors statistic is provided in Figure 2.

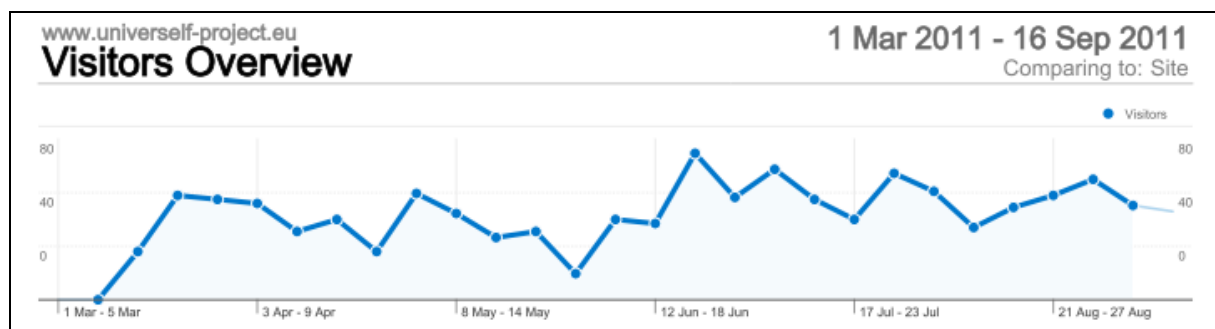


Figure 2. UniverSelf website statistic on the number of visitors since March 2011 (start of statistics recording).

In addition, project partners manage the SimpleWeb website at <http://www.simpleweb.org/>. The website provides links and information on network management, including software, RFCs and tutorials.

2.2 Public documents

During the first project year, UniverSelf has released four public reports covering the main technical achievements of the project. These deliverables, listed in Table 1, are available on the public website of the project.

Table 1. List of UniverSelf public scientific deliverables that have been released (in chronological order)

Deliverable ID	Title	Delivery date
D4.1	Synthesis of use case requirements – Release 1	July 2011
D2.1	UMF Specifications – Release 1	July 2011
D3.1	Identification of suitable classes of methods for parameter optimization	August 2011
D3.3	Identification of suitable classes of methods for learning and operations	August 2011

Besides deliverables, UniverSelf partners have been working to produce milestone reports on work progress and white papers on relevant topics disseminating the project vision and achievements. The following white papers are under finalization and will be made public on the project website:

- Unified Management Framework: the next step in network management,
- Understanding the importance of context knowledge in network management,
- Case study papers. These will describe the six use-cases, defined and currently investigated within UniverSelf, in terms of the problem statement posed, the modelling approach followed and the degree of innovation offered.

2.3 Public communication

Besides traditional dissemination activities, additional communication channels and approaches, with potential high impact, are being used to promote the project achievement. During the first project year, the following materials have been prepared and disseminated:

- **First project leaflet:** a leaflet highlighting the project's objectives, approach and expected impact has been released and disseminated. It is used by UniverSelf partners in order to promote the project at the various events they have been attending. The leaflet is available on the project website at: http://www.univerself-project.eu/system/files/INFSO-ICT-257513_UniverSelf_DataSheet.pdf.
- **First Press release:** A first press release highlighting the project start and major challenges has been published by Alcatel-Lucent on its public website. This created a worldwide visibility for the project and several external parties British Telecom, China Telecom, NORDunet, MERA or else the TeleManagement Forum (TMF) have contacted the project partners in order to express their interest in future achievements. The press release has been relayed over more than 15 top technology and business news websites. The text of this press release is provided in Annex B.

2.4 Scientific publications and presentations

The UniverSelf vision and approach, as well as early results from project partners, have been disseminated by means of scientific publications. As depicted in Table 2, a large number of dissemination activities, including joint initiatives, have been already undertaken.

Table 2. Scientific publications

Scientific Publications	Conferences	Book Chapters	Journals	Total
Published or Accepted for publication	27	3	5	35
Submitted under review	3	-	6	9
Total	30	3	11	44

The project objective is to be active and visible in all main workshops, conferences and journals on network management. As an illustration of this, seven papers (including regular, short and poster papers) from project partners have been accepted for presentation at the 7th International Conference on Network and Service Management (<http://www.cnsm2010.org/>), which is a premier, highly selective conference in the general area of network and services management. This represents a very positive result and will ensure a worldwide visibility for UniverSelf and its achievements.

A comprehensive list of submitted and accepted papers, as well as performed presentations during the first project year, can be found in Annex A. This list, which is also available on the project public website, shows the variety and interdisciplinarity of targeted events. Besides, several of these publications are joint contributions from the project partners.

2.5 Organization of dissemination events

In order to increase the scientific visibility of UniverSelf, the project partners have been actively participating in the organisation of dissemination events, such as conferences and workshops, as well as special issues in high-impact journals. In this context, the following activities have been achieved during the first project year:

- UniverSelf partners participated to the organization and contributed to the Federation Workshop, which took place in the context of Future Network and Mobile Summit 2011, 15-17 June 2011 in Warsaw, Poland. The Workshop was co-organized by UniverSelf, OneFIT and One projects; its purpose was to discuss the different approaches to federation that are being investigated in these ICT FP7 projects, focusing on how networks and their management can be federated using the approaches investigated in the three projects. Indeed, the workshop aimed to exploit complementarities between the approaches and to identify any potential gaps when looking at the whole network from access, core to backbone. The workshop initiated by UniverSelf has been a fair success and attracted more than 45 attendees during its four technical and panel sessions. The objectives and programme of this workshop can be found in Annex C.
- Members of UniverSelf steered the guest editing of a special issue on “Managing an Autonomic Future Internet” in the IEEE Network Magazine. Indeed, this special issue covers the main research topics that are addressed by the UniverSelf project. The magazine is expected to host papers from activities around the world. The special issue schedule is as follows: April 1st, 2011 (Full Paper Submissions), August 1st, 2011 (Author Notification about Acceptance) and September 1st, 2011 (Accepted papers in Final Form). More details on the special issue can be found at: <http://dl.comsoc.org/livepubs/ni/info/cfp/cfpnetwork1111.htm>. The special issue received 35 submissions out of which 6 have been accepted for publication in the IEEE Network Magazine special issue and 1 publication has been accepted and redirected for publication later labelled as an open call. The special issue preparation was also the occasion for the guest editors (Panagiotis Demestichas, Martin Vigoureux, Mikhail Smirnov, Antonio Manzalini, Sudhir Dixit) to draft the Guest Editorial on "Managing an Autonomic Future Internet" that will be published in the IEEE Network Magazine. This editorial references UniverSelf and acknowledges the special issue as an activity related to our project.
- Members of UniverSelf are involved in the organisation of a workshop on "How disruptive technologies influence the FI ecosystem", which will be held in the context of the Future Internet Week, 24-28 October 2011 in Poznan, Poland. The workshop is co-organized by the UniverSelf project, the SESERV support action and the FISE working group. The expected outcome is a shared understanding of FI business ecosystem, the stakeholders and a comparison of approaches used to understand both baseline and future scenarios. More details about the workshop can be found at: [http://fisa.future-internet.eu/index.php/%22FISE Workshop: How Disruptive Technologies Influence the FI Business Ecosystem%22](http://fisa.future-internet.eu/index.php/%22FISE%20Workshop:%20How%20Disruptive%20Technologies%20Influence%20the%20FI%20Business%20Ecosystem%22)
- Members of UniverSelf participated to the submission of a workshop proposal for the 2010 IEEE Wireless Communication and Networking Conference (<http://www.ieee-wcnc.org/2012>). The workshop proposal is entitled "2nd International Workshop on Self-Organizing Networks (IWSON)" and aims to cover the following topics: self-configuration, self-optimisation, self-healing, supporting SON functions and technologies, field trials and demonstrators in the context of self-organizing networks.
- INRIA acted as general chair and co-organizer of the 5th International Conference on Autonomous Infrastructure, Management and Security (AIMS 2011). More information can be found at: <http://www.aims-conference.org/2011/AIMS2011/Welcome.html>.
- Members of UniverSelf participated in the organization of the 7th International Conference on Network and Service Management (CNSM 2011) as General Chair (Prosper Chemouil, Orange Labs), Program Co-Chair (Olivier Festor, INRIA Nancy Grand Est), Finance Chair (Samir Ghamri-Doudane, Alcatel-Lucent Bell

Labs), Webmaster (Olivier Festor, INRIA Nancy Grand Est), Steering Committee member (Aiko Pras, University of Twente), and members of the Technical Program Committee.

- UniverSelf partners have initiated the preparation of two special issue proposals for the International Journal of Network Management (<http://onlinelibrary.wiley.com/journal/10.1002/%28ISSN%291099-1190>). More details regarding this initiative will be presented in the next trendsetting reports.

2.6 Participation to other events with support from the European Commission

UniverSelf has been actively participating in events and initiatives organized by the European Commission, such as: the Future Internet Assembly, Concertation and Cluster meetings, as well as EC promoted conferences. The project activities in this context include:

- The participation (from TI, ALBLF and FT) in the organization and animation of a networking session at ICT 2010 (29 September 2010 in Brussels, Belgium) on the topic of "Assessment of impacts of Autonomic and Cognitive Networking". This networking session was prepared and submitted by TI.
- The participation of multiple UniverSelf partners to the EC D1 Concertation and Cluster meetings on 18-20 October 2010 in Brussels, Belgium. The objective was to present UniverSelf's vision and planned activities, as well as to have a first contact with the projects belonging to the Future Internet cluster. The project was represented at this event by the coordinator (ALBLF). Follow-up liaisons and joint initiatives have been then triggered (as reported in this document).
- The organisation and chairing of the panel on "Information and Execution Automation between the Service and Network planes" at the Future Internet Cluster meetings on 09 February 2011 in Brussels, Belgium. Several ICT FP7 projects of the FI cluster participated to this panel and presented their perspectives on this issue, which allowed fruitful discussions on the aforementioned topic.
- The co-chairing of the Future Internet cluster. Martin Vigoureux (ALBLF) has been appointed at the February 2011 cluster meeting.
- The participation (from UCL) in the Net!works EU Technology Platform research activities and publications: a position paper on "Future Networks" and a white paper on "Future Networks and Management" are planned (Q4 - 2011).
- The participation of multiple UniverSelf partners to the Future Internet week events (including the FIA) that have been held on: 13-17 December in Ghent, Belgium; and 16-19 May 2011 in Budapest, Hungary. Indeed, UniverSelf partners are particularly interested in and participating to the following FIA working groups: FIArch (Vision on the Future Internet Architecture), FISE (Future Internet Socio Economics) and the Standardization working group.
- The proposal of three sessions for the next Future Internet Assembly to be held on 24-28 October 2011 in Poznan, Poland. After a voting process, the three sessions have been ranked in top five. Consequently, UniverSelf partners will be the main drivers and organizers of the following FIA sessions: (1) Value creation, value flows and liability over virtual resources; (2) Trustworthiness of services and infrastructure; and (3) Architectures. More details about these sessions can be found at: <http://www.future-internet.eu/home/future-internet-assembly/poznan-october-2011.html>.
- The involvement (of ALBLF, UCL and NKUA) in the FIA steering committee.
- The publication and presentation of three papers (cf. Annex A), as well as the organization of the Federation Workshop (cf. Annex C), at the Future Network and Mobile Summit on 15-17 June 2011 in Warsaw, Poland.

2.7 Open source solutions for management of Future Networks

A set of integrated management platforms and supporting systems are being developed in the UniverSelf project. Some of such components and platforms are planned to be issued as open source solutions aiming to create a highly open and flexible environment for Management of Future Networks.

UniverSelf partners that plan to issue these open source solutions would commit to update, maintain and use these open source systems beyond the project period. The following is a short description of the open solutions under development, which are planned for release as open-source solutions as part of the UniverSelf UMF Framework. Of course, this is only a partial list of already identified software features; this list will be updated and augmented during the project course (according to future development plans).

Software Defined Networks & Services (SDNS) Platform - UCL

SDNS Platform, which is under development at UCL, represents an integration of computing with network virtualisation (e.g. an in-network cloud) and its functionality includes a Virtualization layer, which contains all of the virtualization technologies that abstract the elements in the hardware layer and provide the necessary management and orchestration functions needed to build and deploy services. It also includes a Service layer, which supports and contains the services themselves. The services use the various service APIs in order to access the elements in the virtualization layer. In the SDNS Platform the Virtual Routers, Virtual Links and Service Components are Java based Virtual Machines. The following systems are planned for development:

- Monitoring of service components and keeping the dynamic links between them up-to-date.
- Knowledge and Context service distributed platform for collecting, storing and distributing context & knowledge information to clients.
- Virtualisation of networking and computational resources and linking virtual resources with real resources.
- Service enablers and self - functionality (self-monitoring, self-configuration, self-optimisation and self-adaptation).
- Control & Orchestration capabilities for managing the composition and decomposition of multiple domains.
- Programmability of the Virtualisation environment.

Integrated Vulnerability Management - INRIA

Providing a fully automated chain to manage vulnerabilities is essential to build the self-protection dimension of the future Internet. We will provide the missing pieces in the well-established *cfengine* configuration framework (<http://www.cfengine.org>) to support this self-management feature. The following components are under development:

- A full-fledged OVAL (Open Vulnerability Assessment Language) specifications framework; the objective is to enable the autonomic system to extract the knowledge provided by vulnerability descriptions specified with this language (<http://oval.mitre.org>).

A translation engine generating *cfengine* policies from OVAL specifications; these policies will then be interpreted by the configuration framework in order to prevent vulnerabilities and maintain safe configurations (as part of the work done in particular in Use Case 2 and Task Force 3.3.D).

2.8 Collaboration and liaisons with other EU-funded projects and beyond

UniverSelf is pursuing collaborations and liaison activities with current national and European projects (ICT FP7 and Eureka/Celtic frameworks), as well as research initiatives and fora at European and international level. A dedicated liaison process has already been defined and put in place within the project in order to facilitate exchange and synergies with other EU-funded projects. Moreover, a dedicated UniverSelf member is appointed (or will be) as contact person for each liaison with the aim to ensure efficient collaborations. A specific document (relative to milestone MS45), entitled "Review of project liaisons: initial links with Future Internet international projects", has been issued; it details the global objectives as well as the list of currently

investigated liaisons (project descriptions, topics of common interest, means of interactions and appointed contacts). It currently includes the following projects and initiatives:

- SAIL (ICT FP7 project): Scalable and Adaptive Internet Solutions.
- ECODE (ICT FP7 project): Experimental Cognitive Distributed Engine.
- ONEFIT (ICT FP7 project): Opportunistic networks and Cognitive Management Systems for Efficient Application Provision in the Future Internet.
- ONE (ICT FP7 project): Towards Automated Interactions between the Internet and the Carrier-Grade Management Ecosystems.
- ETICS (ICT FP7 project): Economics and Technologies for Inter-Carrier Services.
- CONSERN (ICT FP7 project): COoperative aNd Self growing Energy awaRe Networks.
- SESERV (coordination and support action): Socio-Economic Services for European Research Projects.
- COMMUNE (Celtic Project): Cognitive network Management under Uncertainty.
- ETSI AFI (ISG - Industry Specification Group): Autonomic network engineering for the self-managing Future Internet.
- ITU-T FG FN (Pre-standardization group): Focus Group on Future Networks.
- TMF (Industry association): TeleManagement Forum.

Some of these liaisons have been already implemented through regular interactions, technical discussions, face-to-face meetings (at the Future Internet Weeks, as well as concentration and cluster meetings) and the organization of joint dissemination events. As concrete examples of such joint events, UniverSelf has chaired a panel at the February 2011 cluster meeting with the participation of several ICT projects (cf. section 2.6); has co-organized the Federation Workshop together with OneFIT and ONE projects (cf. section 2.5); is co-organizing a workshop on "How disruptive technologies influence the FI ecosystem" together with the SESERV support action and the FISE working group (cf. section 2.5); in addition to the technical sessions that are part of the Future Internet Assembly program (25-26 October 2011 in Poznan, Poland).

Moreover, UniverSelf partners have assessed the feasibility and relevance of using National and European experimental facilities, within the FIRE – Future Internet Research and Experimentation – Initiative, in order to experiment and validate the emerging UniverSelf technologies at large scale. A dedicated milestone has been achieved (MS37) and a dedicated report on "predisposition of access to external test-bed(s) facilities" has been released.

2.9 Trust and certification trendsetting activities

One of the main trendsetting objectives of UniverSelf is to establish and develop the trust from all stakeholders of the autonomic networking ecosystem. A concrete plan towards this objective has been established at the start of the project and is continuously assessed and adapted to emerging opportunities. Moreover, the ETSI agreed to closely cooperate with the UniverSelf consortium and provide a significant help (logistics, contacts and expertise) in preparing and organizing dedicated events. During the first project year, UniverSelf partners have started implementing this plan through:

- An accepted presentation at ETSI workshop on Future Networks technologies, which will be held on 26-27 September 2011 in Sophia-Antipolis, France. The presentation is entitled "Unified approach to Trust in Autonomic Networks and their Management" and focuses on highlighting the standardization needs and opportunities related to this topic.
- The co-organization of a dedicated session at the Future Internet Assembly (FIA) to be held on 24-28 October 2011 in Poznan, Poland. This session is entitled "Trustworthiness of services and infrastructure". It also covers the standard perspective (in line with FIA Standardization activities) and aims to discuss how to subscribe trust, certification, labelling and testing to standardization bodies' agenda such as ETSI or TMF.
- The preparation of a questionnaire and list of experts in collaboration with task 4.4 (conducting technical work on trust and certification). Indeed, Project partners identified 13 key questions around trust in autonomics with which they are approaching a dozen of distinguished international experts in

trust engineering and four ETSI cross-disciplinary groups dealing with the issues of trust in aeronautics, intelligent transport systems, testing methods and interoperability.

- Initial steps towards the organization of the first planned meeting (related to milestone MS46 as per the project planning). This first workshop, which should take the form of an inter-disciplinary technical meeting, will be organised at the ETSI headquarters involving industrials with interest in autonomous processes from the aeronautics, logistics and transportation fields; the aim of the first workshop will be to discuss, share and establish the basic requirements catalogue for “how to enforce trust for the users of autonomous products?”. This technical meeting would involve the UniverSelf Partners, the ETSI AFI, as well as ETSI TC AERO (Technical Committee on Aeronautics) and ETSI TC ITS (Technical Committee on Intelligent Transport Systems). ETSI will help in coordinating the workshop organisation and inviting all the members of these relevant ETSI work groups.

2.10 Standardization and pre-standardization

UniverSelf partners have worked towards providing a first version of the standardization plan describing potential working groups and initiatives relevant for the project. This plan is detailed in the D5.1 deliverable and covers the following standardization bodies (and relevant groups or activities within these organizations):

- 3GPP: RAN2, RAN3, SA1, SA2, SA5.
- ETSI: ISG AFI, RRS.
- IEEE: P1900.x, 802.21.
- IETF: NETMOD.
- IRTF: NMRG, LCCN, Network Complexity.
- ITU-T: SG13 FG-FN.
- NGMN Alliance: P-SON, NGMN and TMF cooperation.

As a second step, partners have started the refinement of the UniverSelf standardization strategy. The objective is to identify a restricted set of standardization groups, to be targeted in priority, and to establish a detailed action plan taking into account the planned project achievements and their timing. The completion of this second step corresponds to a project milestone (MS48) and a dedicated document will then be issued.

A first standard influenced by the UniverSelf project, where UniverSelf is referenced explicitly, has been released officially in June 2011 (i.e. ITU-T recommendation Y.3001 - downloadable from <http://www.itu.int/rec/T-REC-Y/e>). This standard recommendation represents the first definition and agreement in any standardisation groups on future networks and also it is the first management standard which is based on 'in-band management/network empowerment' approach. The Y.3001 document was approved in June by the ITU-T plenary. It was developed in the preceding year by the ITU-T Focus Group on Future Networks (ITU-T FG FN <http://www.itu.int/en/ITU-T/focusgroups/fn/Pages/Default.aspx>), which was co-lead by UCL (member of UniverSelf).

The Y.3001 Recommendation describes objectives and design goals for Future Networks (FNs). In order to differentiate FNs from existing networks, four objectives were identified, which are service-, data-, environment-, and social and economic awareness. In order to realize the objectives, twelve design goals were identified, which are: service diversity, functional flexibility, virtualization of resources, data access, energy consumption, service universalization, economic incentives, network management, mobility, optimization, identification, reliability and security. This Recommendation assumes that the target timeframe for FNs falls approximately between 2015 and 2020. In the annexes, the document describes technologies elaborated in recent research efforts that are likely to be used as an enabling technology for each design goal. Y.3001 was synchronised with deliverable D2.1 of WP2, where 23 top-down specific requirements for managing Future Networks were explicitly elicited.

A second standard influenced by the UniverSelf project, where UniverSelf is referenced explicitly, has been also released officially in June 2011 (i.e. ETSI GS AFI-001 - downloadable at http://webapp.etsi.org/action%5CPU/20110705/gs_AFI001v010101p.pdf). This specification is the first main achievement for the ETSI AFI group on the Work Item #1 entitled "Scenarios, Use Cases and Requirements for Autonomic-Self-Managing Future Internet".

Besides this, during the first project year, partners participated in several standardization meetings, with the aim to monitor the current activities, present topics related to current UniverSelf activities and assess opportunities for future contributions based on the project output and agreed plan. These meetings are:

- ETSI AFI meeting on 3-4 November 2010 in Budapest.
- IETF (and IRTF) meeting on 7-12 November in Beijing.
- ITU FG-FN meeting on 29 November – 3 December 2010 in Ljubljana.
- ETSI AFI meeting on 16-18 March 2011 in Sophia-Antipolis,
- IETF (and IRTF) meeting on 27-31 March 2011 in Prague,
- Standardisation session II.4 at the FIA conference on 17-19 May 2011 in Budapest, Hungary. The event report is available at: http://www.future-internet.eu/fileadmin/documents/budapest_documents/FIA-Budapest_Consolidated_final_300611.pdf.
- IETF (and IRTF) meeting on 24-29 July 2011 in Quebec.

In addition, two presentations, jointly prepared by UniverSelf partners, have been accepted at the ETSI workshop on Future Networks technologies, which will be held in Sophia-Antipolis on 26-27 September 2011. The goal of this workshop is to identify potential needs for standardization or pre-standardization of Future Network Technologies at ETSI (more details can be found on the workshop website: <http://www.etsi.org/WebSite/NewsandEvents/FNT/FutureNetworkTechnologies.aspx>). These presentations are entitled:

- "Unified Management Framework: Processes and Tools for Establishing Autonomics in the Management of Networks and Services" (related to WP2 activities on UMF design),
- "Unified approach to Trust in Autonomic Networks and their Management" (related to Task 4.4 activities on trust and certification).

3 Conclusion

The UniverSelf consortium has been very active in terms of trendsetting activities during the first year of the project. This report details the activities achieved in this context, which covers: the project web presence, the public release of project promotion publications as well as technical documents, a significant number of scientific publications in main conferences and journals on network management, the organization of several dissemination events, the collaboration with international research initiatives, the initial steps towards standardization, among other achievements.

As a self-assessment, we can report that the project has delivered significant results in all areas of the work package 5, reaching (and in some areas exceeding) its objectives. The project has delivered a sustained and successful promotion of the project activity and achievements so far.

The main trendsetting achievements in year 1 of UniverSelf are:

- A total of 44 scientific publications: 35 published or accepted for publication, 9 submitted for review.
- Public release of 4 major technical reports (D2.1, D3.1, D3.3, D4.1) and 2 general project promotion publications: the project leaflet and a first press release.
- Set-up and maintenance of an active web presence, which is referenced by Wikipedia.
- Release of two of the first standards with contribution and influence from the UniverSelf project:
 - Y.3001 recommendation approved in June 2011 by the ITU-T plenary. This standard recommendation represents the first definition and agreement in any standardisation groups on future networks and is the first management standard based on “in-band management/network empowerment” approach.
 - AFI-0001 group specification approved in May 2011 by ETSI. This group specification defines scenarios, use cases and requirements for an autonomic and self-managing future Internet as developed by the ETSI AFI Industry Specification Group.
- Planning, monitoring of and participation in standardisation or pre-standardisation group meetings (7).
- Organisation and participation in relevant dissemination events and activities: workshops, special issues (6), events with European Commission support.
- Collaboration with other EU-funded projects and international research initiatives (11).
- Preparation and planning of open-source solutions for management of future networks: 2 platforms under development at UCL and INRIA.

The objective for the next period is to sustain the project efforts in promoting the project vision and results, especially by:

- Strengthening the web-presence of the project and public releasing of technical documents (planned deliverables as well as relevant white papers).
- Preparing and distributing technical newsletters, as well as further press releases, in order to promote the project technical achievements.
- Maintaining the consortium efforts in delivering high quality scientific publications (while targeting joint papers among partners) and organizing impactful dissemination events.
- Encouraging and supporting publications on the main project objectives and outcome, such as the Unified Management Framework, the Network Empowerment mechanisms, the technology of trust and certification.
- Promoting the major project achievements and innovation through participation in exhibition, demonstration and interoperability events with premium proof-of-concept prototypes using the UniverSelf technology.
- Sustaining the collaboration with research initiatives at European and international level, and investigating new liaisons.
- Strengthening, pursuing the refinement, as well as the implementation, of the project standardization plan, which will be continuously assessed and adapted to emerging opportunities.

- Development and realization of the exploitation plans by academic and industrial partners.

Of course, this is a non-exhaustive list of tools and targeted activities. The document will be updated annually to highlight the latest project trendsetting achievements.

Abbreviations

3GPP	3 rd Generation Partnership Project
3GPP LTE	3GPP Long Term Evolution
3GPP SAE	3GPP Service Architecture Evolution
AFI	Autonomic network engineering for the self-managing Future Internet
ETSI	European Telecommunications Standards Institute
FG-FN	Focus Group – Future Networks
FIA	Future Internet Assembly
ICT	Information and Communication Technologies
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
IMT	International Mobile Telecommunications
IRTF	Internet Research Task Force
ISG	Industry Specification Group
ITU-T	International Telecommunication Union – Telecommunications standardisation sector
LTE	Long Term Evolution
NGMN	Next Generation Mobile Networks
NMRG	Network Management Research Group
OVAL	Open Vulnerability Assessment Language
RAN	Radio Access Network
RRS	Reconfigurable Radio Systems
SDNS	Software Defined Networks and Services Platform
SON	Self Organized Networks
TMF	TeleManagement Forum
UMF	Unified Management Framework

Annex A – Scientific publications and presentations

The following sections give a complete list of the scientific publications and presentations realized by project partners in the context of the UniverSelf project.

Published and accepted papers

Journals:

- S. Georgoulas and K. Moessner: "Towards Efficient Protocol Design through Protocol Profiling and Performance Assessment: Using Formal Verification in a Different Context", accepted for publication in the Wiley International Journal of Communication Systems.
- N. Wang, C. Michael and K. Hon Ho: "Disruption-Free Green Traffic Engineering with Not-Via Fast Reroute", accepted for publication in the IEEE Communications Letters.
- K. Tsagkaris, M. Akezidou, A. Galani and P. Demestichas: "Evaluation of signalling loads in cognitive network management architecture", accepted for publication in the International Journal of Network Management.
- K. Tsagkaris, G. Athanasiou, M. Logothetis, Y. Kritikou, D. Karvounas and P. Demestichas: "Introducing Energy Awareness in the Cognitive Management of Future Networks", accepted for publication in the Journal of Green Engineering (as invited paper).
- M. Wódczak, T.B. Meriem, R. Chaparadza, K. Quinn, B. Lee, L. Ciavaglia, K. Tsagkaris, S. Szott, A. Zafeiropoulos, B. Radier, J. Kielthy, A. Liakopoulos, A. Kousaridas and M. Duault: "Standardising a Reference Model and Autonomic Network Architectures for the Self-managing Future Internet", Submitted to the IEEE Network Magazine Special Issue on Managing an Autonomic Future Internet.

Conferences and Workshops:

- H. Eckhardt, S. Klein, and M. Gruber: "Vertical antenna tilt optimization for LTE base stations", In proceedings of the International Workshop on Self-Organizing Network at IEEE VTC Spring 2011, May 2011, Budapest, Hungary.
- N. Wang, A. Fagear and G. Pavlou: "Adaptive Post-failure Load Balancing in Fast Reroute Enabled IP Networks", In proceedings of the IFIP/IEEE International Symposium on Integrated Network Management (IM 2011), May 2011, Dublin, Ireland.
- A. Sperotto and A. Pras: "Flow-based Intrusion detection", In proceedings of the IFIP/IEEE International Symposium on Integrated Network Management (IM 2011), May 2011, Dublin, Ireland.
- T. Fioreze and A. Pras: "Self-Management of Hybrid Optical and Packet Switching Networks", In proceedings of the IFIP/IEEE International Symposium on Integrated Network Management (IM 2011), May 2011, Dublin, Ireland.
- P. Demestichas, K. Tsagkaris, G. Athanasiou and Y. Kritikou: "Green Footprint of Cognitive Management Technologies for Future Networks", In proceedings of the Workshop on ECO-Efficient ICT at the 34th International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO 2011), May 2011, Opatjia, Croatia.
- T. Taleb, K. Samdanis, and S. Schmid: "DNS-based Solution for Operator Control of Selected IP Traffic Offload", In proceedings of the IEEE International Conference on Communications (ICC 2011), June 2011, Kyoto, Japan.
- M. Gruber, S. Borst and E. Kühn: "Stable interaction of self-optimization processes in wireless networks", In proceedings of the Workshop on Planning and Optimization of Wireless Communication Networks at IEEE ICC 2011, June 2011, Kyoto, Japan.
- R. Combes, Z. Altman, M. Haddad and E. Altman: "Self-optimizing strategies for interference coordination in OFDMA networks", In proceedings of the Workshop on Planning and Optimization of Wireless Communication Networks at IEEE ICC 2011, June 2011, Kyoto, Japan.

- L. Ciavaglia, C. Destré, G. Nguengang, P. Demestichas, M. Gruber, M. Smirnov, A. Manzalini, N. Alonistioti, S. Ghamri-Doudane, A. Galis: “Realizing Autonomics for Future Networks”, In proceedings of the Future Network and Mobile Summit, June 2011, Warsaw, Poland.
- V. Gonçalves, L. Ciavaglia, S. Delaere and P. Ballon: “A Survey of the Future Internet Business Ecosystems”, In proceedings of the Future Network and Mobile Summit, June 2011, Warsaw, Poland.
- S. Georgoulas, M. Ghader, K. Moessner, M. Dianati and R. Tafazolli: “On the Applicability of Architecture Description Languages to Future Internet Networking Environments”, In proceedings of the Future Network and Mobile Summit, June 2011, Warsaw, Poland.
- M. Barrere, R. Badonnel, and O. Festor: “Toward Vulnerability Management in Autonomic Networks and Services”, In Proceedings of the IFIP International Conference on Autonomous Infrastructure, Management and Security (AIMS 2011) – PhD Symposium, June 2011, Nancy, France.
- R. Schmidt, A. Pras: “Estimating bandwidth requirements using flow-level measurements”, In Proceedings of the IFIP International Conference on Autonomous Infrastructure, Management and Security (AIMS 2011), June 2011, Nancy, France.
- X. Gelabert, B. Sayrac and S. Ben Jemaa: “a performance evaluation framework for control loop interaction in self organizing networks”, In Proceedings of the 22nd annual IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC 2011), September 2011, Toronto, Canada.
- L. Ciavaglia, Z. Altman, E. Patouni, A. Kaloxylas, N. Alonistioti, K. Tsagkaris, P. Vlacheas and P. Demestichas: “Coordination of Self-Organizing Network Mechanisms: Framework and Enablers”, In proceedings of the Special Session on Future Research Directions at ICST MONAMI 2011 conference, September 2011, Aveiro, Portugal.
- R. Hofstede, I. Drago, A. Sperotto and A. Pras: “Flow Monitoring Experiences at the Ethernet-Layer”, In proceedings of the 17th EUNICE 2011 Workshop on “Energy-Aware Communications”, September 2011, Dresden, Germany.
- R. Combes Z. Altman, E. Altman: “Self-organizing relays in LTE networks: queuing analysis and algorithms”, In Proceedings of the 7th International Conference on Network and Service Management (CNSM 2011), October 2011, Paris, France.
- M. Barrere, R. Badonnel, and O. Festor: “Supporting Vulnerability Prevention in Autonomic Networks using OVAL”, In Proceedings of the 7th International Conference on Network and Service Management (CNSM 2011), October 2011, Paris, France.
- D. Tuncer, M. Charalambides, G. Pavlou and N. Wang: “Coordinated, Decentralized and Adaptive Network Resource Management”, In Proceedings of the 7th International Conference on Network and Service Management (CNSM 2011) – Mini-conference track, October 2011, Paris, France.
- S. Clayman, R. Clegg, L. Mamatas, G. Pavlou and A. Galis: “Monitoring, Aggregation and Filtering for Efficient Management of Virtual Networks”, In Proceedings of the 7th International Conference on Network and Service Management (CNSM 2011) – Mini-conference track, October 2011, Paris, France.
- V. Ayyadurai, K. Moessner and R. Tafazolli: “Multihop Cellular Network Optimization using Genetic Algorithms”, In Proceedings of the 7th International Conference on Network and Service Management (CNSM 2011) – Poster Sessions, October 2011, Paris, France.
- P. Vlacheas, V. Thomatos, K. Tsagkaris and P. Demestichas: “Autonomic Downlink Inter-Cell Interference Coordination in LTE Self-Organizing Networks”, In Proceedings of the 7th International Conference on Network and Service Management (CNSM 2011) – Poster Sessions, October 2011, Paris, France.
- G. Athanasiou, K. Tsagkaris, P. Vlacheas and P. Demestichas: “Introducing Energy-Awareness in Traffic Engineering for Future Networks”, In Proceedings of the 7th International Conference on Network and Service Management (CNSM 2011) – Poster Sessions, October 2011, Paris, France.
- V. Gonçalves, M. Stamatelatos, A. Manzalini, B. Fuentes, M. Gruber, C. Destré, S. Delaere, and L. Ciavaglia: “Construction, instantiation and analysis of a business ecosystem for autonomic future networks”, In proceedings of the ICIN 2011 Conference, October 2011, Berlin, Germany.
- C. Wang, N. Wang, M. Howarth and G. Pavlou: “An Empirical Study on the Interactions between ALTO-assisted P2P Overlays and ISP Networks”, In proceedings of the Workshop on Wireless and Internet

Services (WISE) at the IEEE Conference on Local Computer Networks (LCN 2011), October 2011, Bonn, Germany.

- D. Kliazovich, T. Sutinen, H. Kokkonen-Tarkkanen, J. Mäkelä, and S. Horsmanheimo: "Hierarchical Management Architecture for Multi-Access Networks", In proceedings of the IEEE Global Communications Conference (GLOBECOM 2011), December 2011, Houston, USA.
- K. Tsagkaris, P. Vlacheas, A. Bantouna, P. Demestichas, G. Nguengang, M. Bouet, L. Ciavaglia, P. Peloso, I. Grida Ben Yahia, C. Destré "Operator-driven Framework for Establishing and Unifying Autonomic Network and Service Management Solutions", In Proceedings of the The 3rd IEEE International Workshop on Management of Emerging Networks and Services (MENS 2011) at the IEEE Global Communications Conference (GLOBECOM 2011), December 2011, Houston, USA.

Book Chapters:

- M. Serrano, S. Davy, M. Johnsson, W. Donnelly and A. Galis: "Review and Designs of Federated Management in Future Internet Architectures" part of the book "The Future Internet - Future Internet Assembly 2011: Achievements and Technological Promises", Lecture Notes in Computer Science, Vol. 6656, 465 pp, ISBN 978-3-642-20897-3, May 2011.
- A. Bantouna, K. Tsagkaris, V. Stavroulaki and P. Demestichas: "Machine Learning applied to Cognitive Communications", chapter of the book "Cognitive Communications: Distributed Artificial Intelligence (DAI), Regulatory Policy & Economics, Implementation", published by J. Wiley and Sons.
- A. Bantouna, K. Tsagkaris, V. Stavroulaki and P. Demestichas: "Learning Techniques for Context Diagnosis and Prediction in Cognitive Communications", chapter of the book "Cognitive Communications: Distributed Artificial Intelligence (DAI), Regulatory Policy & Economics, Implementation", published by J. Wiley and Sons.

Submitted papers under review

Journals:

- R. G. Clegg, S. Clayman, G. Pavlou, L. Mamatras and A. Galis: "Selection of management/monitoring nodes in virtual networks", submitted to IEEE Transactions on Computers.
- T. Fioreze, A. Pras: "Self-management of Hybrid Networks: Pros and Cons", submitted to the IEEE Communications Magazine.
- A. Sperotto, M. Mandjes, R. Sadre, P.T. de Boer and A. Pras: "Autonomic Management of Anomaly-Based Intrusion Detection Systems", submitted to IEEE Transactions on Networks and Service Management.
- G. Athanasiou, K. Tsagkaris, D. Karvounas, P. Vlacheas and P. Demestichas: "Modern Multi-Objective Traffic Engineering for Future Networks", submitted to the IEEE Communications Letters.
- T. Sutinen, H. Rivas and J. Huusko: "Multi-Interface extension to scalable video streaming architecture", submitted to the Journal of Communications special issue on advances in communications and networking.
- J. Lessmann, Z. Yousaf, P. Mannersalo, E. Patouni, S. Klein, P. Loureiro and G. Athanasiou, "A Collaborative End-to-End Resource Management Framework for Cellular Networks", submitted to the IEEE Wireless Communications Magazine Special Issue on User Cooperation in Wireless Networks.

Conferences and Workshops:

- S. Clayman and A. Galis: "Self Management for Inter-Connected Smart Objects", submitted to the Workshop on Internet of Things and Service Platforms (IoTSP 2011) at ACM CoNEXT 2011, December 2011, Tokyo, Japan.
- R. Sadre, A. Sperotto and A. Pras: "The Effects of DDoS Attacks on Flow Monitoring Applications", submitted to the ACM Internet Measurement Conference 2011 (IMC 2011), November 2011, Berlin, Germany.

- L. Bennacer, L. Ciavaglia, A. Chibani, Y. Amirat and A. Mellouk: “Optimization of fault diagnosis based on the combination of Bayesian Networks and Case-Based Reasoning”, submitted to the IEEE/IFIP Network Operation and Management Symposium, April 2012, Maui, USA.

Presentations, talks and lectures

- A. Manzalini (session chair), Christian Destré and Laurent Ciavaglia: participation and presentations during the networking session at ICT 2010 on the topic of “Assessment of impacts of Autonomic and Cognitive Networking”, September 2010, Brussels, Belgium.
- L. Ciavaglia: presentation of UniverSelf at the concertation meeting and the Future Internet Cluster meeting, October 2010, Brussels, Belgium.
- A. Galis: Presentation of UniverSelf at the ITU-T workshop, December 2010, Ljubljana, Slovenia.
- A. Galis: Keynote presentation on “Future Networks” at the IEEE ITU-T Kaleidoscope “Beyond the Internet”, December 2010, Pune, India.
- A. Pras: “Learning from the past - why OSI failed”, presentation at the Dagstuhl seminar "Learning from the Past: Implications for the Future Internet and Its Management?", January 2011, Leibniz, Germany.
- R. Sadre: “Is The Future Unpredictable?” - Presentation at the Dagstuhl seminar "Learning from the Past: Implications for the Future Internet and Its Management?", January 2011, Leibniz, Germany.
- A. Pras, A. Sperotto, G. C. M. Moura, I. Drago, R. Barbosa, R. Sadre, R. Schmidt, R. Hofstede: “Attacks by “Anonymous” WikiLeaks Proponents not Anonymous”, technical report published at www.simpleweb.org.
- M. Vigoureux: chair of the panel “Information and Execution Automation between the Service and Network planes” at the Future Internet Cluster meeting, February 2011, Brussels, Belgium.
- K. Tsagkaris, E. Patouni and P. Demestichas: “Information and Execution Automation between the Service and Network planes, UniverSelf perspective: From Use Cases to UMF”, presentation during the panel “Information and Execution Automation between the Service and Network planes” at the Future Internet Cluster meeting, February 2011, Brussels, Belgium.
- P. Demestichas: “The UniverSelf perspective: From Use Cases to Unified Management Framework”, presentation at the Future Internet Cluster meeting, February 2011, Brussels, Belgium.
- P. Demestichas, K. Tsagkaris, G. Athanasiou and G. Nguengang: “Autonomic mechanisms for operator-governed joint network and service management in heterogeneous infrastructures”, presentation at the Second Nordic Workshop on System and Network Optimization for Wireless (SNOW2011), March 2011, Sälen, Sweden.
- A. Galis: “Management of Future Internet and UniverSelf”, presentation at the FIA Budapest Standardisation Session, May 2011, Budapest, Hungary.
- A. Galis: “Future Networks Design Goals”, Key note presentation at the Seventh International Conference on Networking and Services (ICNS 2011), May 2011, Venice, Italy.
- M. Gruber: “Network Empowerment – finding the right key to the lock”, presentation at the Federation workshop – part of the Future Networks and Mobile Summit, June 2011, Warsaw, Poland.
- L. Ciavaglia: “Role and Impact of Autonomics in a Federated Eco-system”, at the Federation workshop – part of the Future Networks and Mobile Summit, June 2011, Warsaw, Poland.
- G. Nguengang: “A Unified Management Framework for Operator-Governed Networks and Services”, at the Federation workshop – part of the Future Networks and Mobile Summit, June 2011, Warsaw, Poland.
- A. Manzalini: chair of the panel “Network Federation - Way Forward” at the Federation workshop – part of the Future Networks and Mobile Summit, June 2011, Warsaw, Poland.
- S. Schmid: “NLE Vision for Beyond 4G (B4G) Mobile Networks”, presentation at NEC-internal workshop, 2011.
- S. Schmid, J. Lessmann, Z. Yousaf: “Motivation and Business Relevance of EU UniverSelf Project”, presentation at NEC-internal workshop, 2011.

- Z. Yousaf, J. Lessmann, P. Loureiro: “Load-Aware Dynamic Instantiation of Mobile Cellular Networks”, Invited presentation at the ComNets Workshop – Advances in Communication Networks, October 2011, Dortmund, Germany.
- Mikhail Smirnov: UniverSelf achievements as MS28 and partially the work of WP3 taskforce on SON interactions were integrated into the two lecture courses at TU Berlin “Advanced Internet Services” (WS2010/2011), and “Future Internet Technologies” (SS2011).
- Mikhail Smirnov: Two UniverSelf presentations for the Technical Board of NGNI in Fraunhofer FOKUS.

Annex B – First UniverSelf press release



Press release

Paris, France, December 22, 2010

Leading European communications companies and research organizations join forces to launch the UniverSelf project as part of the Future Networks 7th Framework Program

Focus on Automating Future Networks

A group of 17 leading European telecommunications service providers, IT corporations, infrastructure vendors and academic institutions have launched “UniverSelf” a research initiative whose goal is to overcome the increasing complexity of managing communication networks and enable their future growth by generating innovations in autonomic networking – technologies that enable networks to manage themselves.

The solutions “UniverSelf” creates will benefit the European ICT industry by creating new business opportunities and standards, benefit EU citizens by improving Quality of Service and improving performance, and benefit telecommunications service providers and network operators by reducing time-to-market and increasing savings in operational expenditure through the optimization of human resources and a reduction in manual errors.

“UniverSelf” is supported within the scope of the European Union’s 7th Framework Programme for Research and Technological Development (FP7) from which it has received 10M€ funding. UniverSelf will last 36 months (2010-2013) and take advantage of the diverse expertise and complementary skills of its members who represent the following corporations and research institutions from across the ICT industry:

Alcatel-Lucent (Project Coordinator), France Telecom (Technical Manager), Telecom Italia (IT), Telefonica I+D (ES), NEC Europe (DE), Thales Communications (FR), Fraunhofer FOKUS (DE), IBBT Interdisciplinary Institute For Broadband Technology (BE), INRIA Institut National de Recherche en Informatique et en Automatique (FR), VTT Valtion Teknillinen Tutkimuskeskus (FI), UCL University College London (UK), UNIS University of Surrey (UK), NKUA National and Kapodistrian University of Athens (GR), UPRC University of Piraeus Research Center (GR), UT Universiteit Twente (NL)

The research program has four objectives:

- 1/ Design a Unified Management Framework for the different existing and emerging architectures, that is cross-technology (i.e. wireless and wireline) and will serve as a common platform for both systems and services.

2/ Design the functions that will enable self-managing networks and embed these functions directly within the systems and elements that comprise the network infrastructure and support service delivery.

3/ Demonstrating the potential for deployment of autonomic solutions in carrier grade networks with an eye towards stimulating further research in Europe towards application and commercialization.

4/ Generate confidence in the viability and use of autonomic technologies in telecommunication networks by defining “certification” parameters for autonomic networking products.

Martin Vigoureux, Research Director at Bell Labs and Project Coordinator, says: *“It is time to take self-management to the next level. UniverSelf, driven by customer needs and focused on the industrial impact of research, is an ideal instrument to start engineering autonomics and make them a reality in operational networks. Numerous challenges lie ahead but delivering efficient, converged and trustworthy solutions, together with the appropriate standards, is essential to reach true operational benefits and wide deployments.”*

Christian Destré, Project Leader at France Telecom-Orange Labs and Project Technical Manager, says: *“From the operator viewpoint, Self-management technologies act as enablers to face the increasing operational management complexity due to networks convergence, usage revolution with the exploding number of IP-based devices and services, and network and service role evolutions related to the Future Internet. Confident unification and standardization are required for a broad adoption and deployment in operational environments.”*

Antonio Manzalini, Project Manager at Telecom Italia says: *“Future networks are likely to evolve towards pervasive environments of link, processing and storage resources and services; virtualization, enabling multiple logical networks to co-exist on top of a same physical infrastructure, will offer new business opportunities but it will increase management complexity even more. Autonomic self-management might be essential part of this vision, considering also that these future networks have to be managed in highly dynamic and unpredictable contexts. At the end of the day, reducing OPEX and enabling new sources of revenues (also with new business models) will decrease the investment risks for Operators.”*

Jose Antonio Lozano-Lopez, Autonomic Communications Division Manager at Telefonica, says: *“Autonomic infrastructure is going to change some of the well established current networking and management paradigms. After some years of successful research, it is the moment to boost autonomics into real operational environments. UniverSelf pragmatic approach to autonomic will provide not only the networking procedures, but also the governance methods and tools to dramatically decrease OPEX on Operators’ operational processes.”*

UniverSelf was launched in Villarceaux, France in the premises of Alcatel-Lucent Bell Labs.

Project Website: www.univerself-project.eu

Contacts:

Project coordinator: Laurent Ciavaglia, Laurent.ciavaglia@alcatel-lucent.com

Project technical manager: Christian Destré, christian.destre@orange-ftgroup.com

Annex C – Summary of the “Federation Workshop”

The joint ONE – ONEFIT – UNIVERSELF workshop on “Federation” initiated by UniverSelf and held at the 20th edition of the Future Network and Mobile Summit in Warsaw, Poland has been a fair success and attracted more than 45 attendees during the 4 sessions. The workshop consisted of thematic technically-focused sessions and a closing panel to debate on the notion of Federation for the networks of the future.

Workshop Overview

The different types of networks available, the range of networking technologies, variety of traffic types with their individual requirements in terms of QoS and security and finally the number of administrative domains that separate the networks produces a rather complex communication system. This complexity affects the access and core network as well as the high speed backbone, and managing the resources of all of these efficiently has yet to be accomplished.

Federation of the currently used approaches and complementing them with new management methods will help overcoming the structural limitations of the communication infrastructures and their management systems. Networks should be managed to be able to allow dynamic, efficient and scalable support of the vast set of user requirements and of applications across federated administrative and technology domains.

The workshop discussed the different approaches that are investigated in the ICT FP7 projects OneFIT, UniverSelf and One. The aim was to work out how the integration and interworking problems can be solved, how networks and their management can be federated using the approaches investigated in the three projects. The aim of the workshop was to exploit complementarities between the approaches and to identify any potential omissions when looking at the whole network from access, core to backbone.

Workshop Organisers

The workshop was organised jointly by the three FP7 projects UniverSelf (<http://www.univerself-project.eu/>), OneFIT (<http://www.ict-onefit.eu/>) and One (<http://www.ict-one.eu/>). The organisation committee included Laurent Ciavaglia and Samir Ghamri-Doudane (representing UniverSelf), Panagiotis Demestichas and Klaus Moessner (representing OneFIT) and Admela Jukan (representing One).

The discussions were on an advanced technical level, after a round of introductions of the main concepts, and in particular an overview of how federation will be approached by each of the projects, more detailed presentations and a panel discussion followed.

Workshop Objectives

The workshop primarily intended to raise further awareness about the problem, but also about the solution approaches being followed. It aimed to help gaining awareness in industry and to identify the most pressing matters in terms of areas for industry consensus.

The second aim was to inspire other researchers and projects to collaborate and contribute to the solution of the problems that UniverSelf, OneFIT and One are tackling. Finally, it was expected to not only federate the networks and management systems of networks, but also to facilitate a more common approach to overcome the complexity and management problem, not only across the organizing projects, but also with other projects that attended the workshop. The outcomes may be discussed in concertation or cluster meetings.

Workshop Agenda and Presenters

The workshop was structured in four parts, distributed over two sessions. The workshop was chaired by Klaus Moessner (University of Surrey), and the Panel session was moderated by Antonio Manzalini (Telecom Italia).

Part A “The Management Challenge”: Overview of the Approaches

Chaired by: Klaus Moessner, University of Surrey, United Kingdom.

A.1: UniverSelf – A Unified Management Framework for Operator - Governed Networks and Services.

By: Gerard Nguengang, THALES Communications, France.

A.2: OneFIT - Opportunistic Networks for Efficient Application Delivery in the Future Internet.

By: Jens Gebert, Alcatel-Lucent Deutschland, Bell Labs, Germany.

A.3: One - An IP and Transport Layer Management Ecosystem.

By: Mohit Chamania, TU Braunschweig, Germany.

Part B "Management Systems"

Chaired by: Klaus Moessner, University of Surrey, United Kingdom.

B.1: UniverSelf – Network Empowerment - Finding the Right Key to the Lock.

By: Markus Gruber, Alcatel-Lucent, Germany.

B.2: OneFIT - Algorithms for Opportunistic Network Management and Infrastructure Coordination.

By : Oriol Sallent, Universitat Politecnica de Catalunya, Spain.

B.3: ONE - Architecture and Cooperation with External Components and Management Systems.

By: Maciej Maciejewski, ADVA Optical Networking, Poland.

Part C: Federation Approaches and Way Forward

Chaired by: Antonio Manzalini, Telecom Italia , Italy.

C.1: UniverSelf – Role and Impact of Autonomics in a Federated Eco-system.

By : Laurent Ciavaglia, Alcatel-Lucent France, France.

C.2: OneFIT - Control Channels for the Cooperation of Cognitive Management Systems.

By: Marcin Filo, Wroclawskie Centrum Badan EIT, Poland.

C.3: ONE - Federation Use Cases.

By: Oscar Gonzalez de Dios, Telefonica I+D, Spain.

Part D: Panel "Network Federation - Way Forward"

Moderated by: Antonio Manzalini, Telecom Italia , Italy.

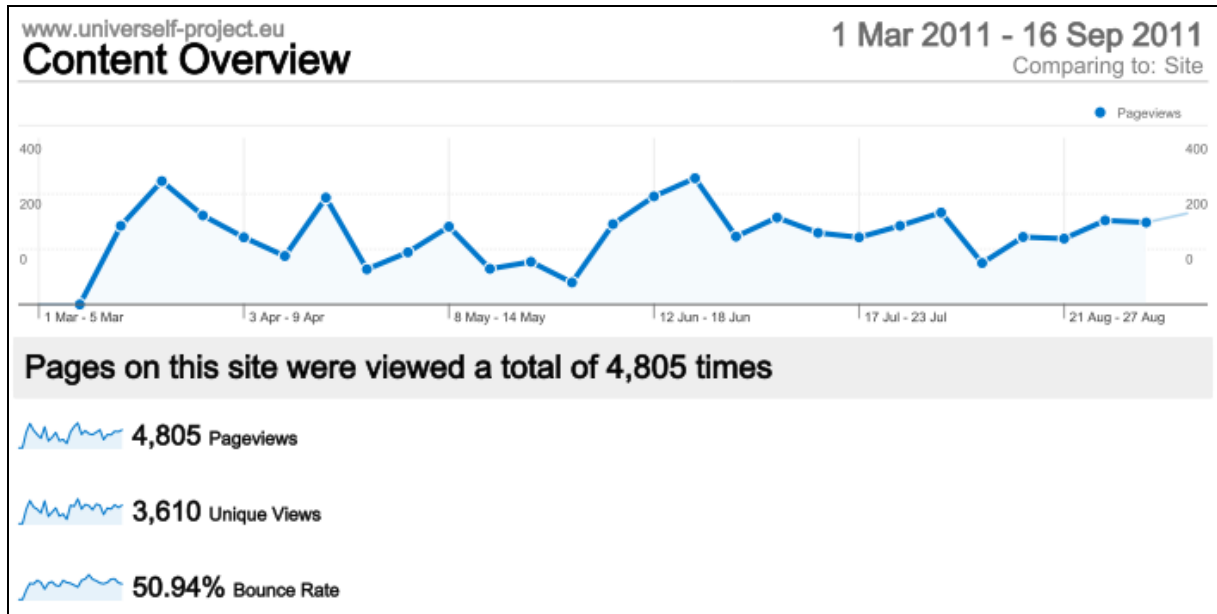
Laurent Ciavaglia, Alcatel-Lucent France, France (UniverSelf)

Prof. Panagiotis Demestichas, University of Piraeus, Greece (OneFIT)

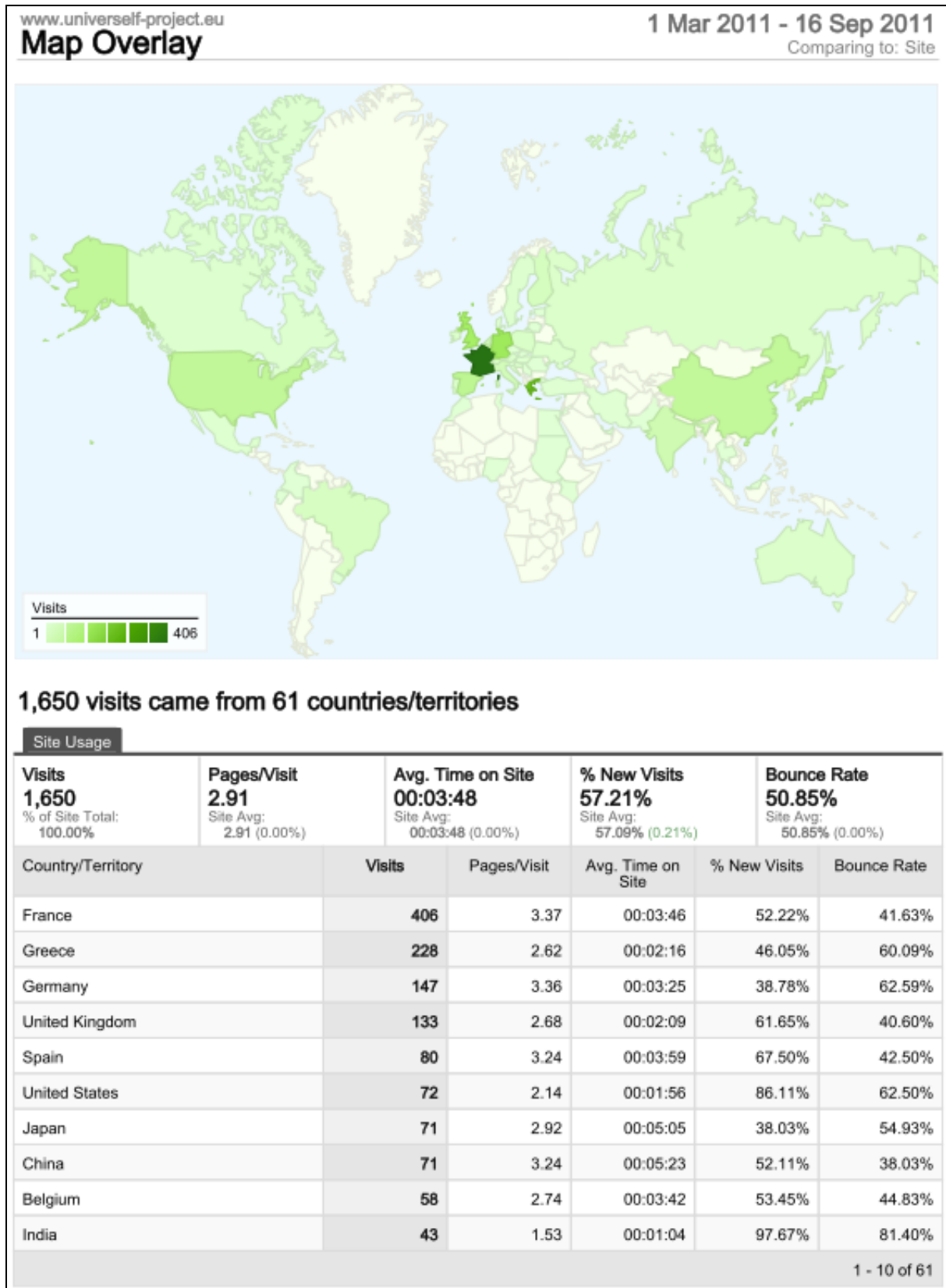
Oscar Gonzalez de Dios, Telefonica I+D, Spain (One)

Annex D – Statistics on the website usage

Content, pages and visitors statistics



Visitors' profile – An international visibility



Traffic sources and search keywords

