Coordination of the European Future Internet Forum of Member States

D3.2(c) – Report on existing Member State Future Internet activities *(M16)*

W. Donnelly, B. Foley, K. Sullivan, V. Nemeth, J. Sesena

Document Number	D3.2(c)
Document Title	Report on existing Member State Future Internet activities *(M16)*
Version	1.0
Status	Final
Work Package	WP3
Deliverable Type	Report
Responsible Partner	AMETIC
Dissemination level	PU

Change History

Version	Date	Status	Author (Unit)	Description
0.1	12/January/2012	Draft	Kieran Sullivan, Brian Foley (WIT)	Update D3.2(b), based on information in ceFIMS database as of December 2012 (M16). Add Appendix on "Institutions"
0.2	19/January/2012	Draft	Julian Sesena (AMETIC)	Partner contributions & quality control check
1.0	24/January/2012	Final	Kieran Sullivan (WIT)	Final edit/format

Table of Contents

1. Introduction

The ceFIMS Coordination Action began its work in September, 2010, and provides functional ongoing support to the European Member State Future Internet Forum (FIF). ceFIMS facilitates FIF activity by providing a Secretariat and support structure, and by maintaining the ceFIMS Future Internet web-portal.

The project has two primary aims:

— To facilitate Future Internet research across Europe by promoting strong Member State engagement and knowledge sharing in the FIF

— To identify synergies and improve FI research effectiveness at Member State level and between Member States and the EC.

The availability of up-to-date information on the widest range of Future Internet Initiatives at Member State and regional levels is vital to achieving these aims: knowledge sharing and exchange of best practice underpins the work of the project. Accordingly, the project is engaged in the process of building a comprehensive picture of Future Internet initiatives at Member State and regional levels across Europe. This information is a valuable resource for Member States, and will also help the project to: analyse the administrative and legal barriers that hinder co-operation: propose practical networking activities; and, support mutual opening mechanisms. A well-managed, accessible body of information will allow the project to document and analyse potential gaps in the European and national Future Internet policies, identify priorities and investment strategies and support the roadmapping activities of the project.

The task of information gathering and analysis (WP3: Stocktaking & Analysis) builds on a Compendium compiled by the European Commission[1]. The project has taken this information and transferred it to a database on the ceFIMS website[2]. With the addition of information gathered from members of the FIF and through the Future Internet Award competition, the database continues to grow into a comprehensive source of information on the wide range of initiatives taking place at Member State and regional level. This repository supports an increased level of awareness of possible collaboration opportunities, as well as helping to exchange information on best practice, test facilities, knowledge and experience. Thus, it works towards avoiding duplication when regions, Member State and EU initiatives seek to address problems arising from interdependencies (both planned and unplanned).

Note that the process of collecting information is ongoing and will continue throughout the lifetime of the project. Thus, this document, D3.2(c), presents the information available on the ceFIMS database as of December 2011 (M16). It also presents a preliminary list of institutions involved in Future Internet research across Europe (Appendix C), as collated by ceFIMS in its data-gathering efforts.

---

[1] http://ec.europa.eu/information_society/activities/foi/lead/fif/index_en.htm

[2] www.cefims.eu/database/

The next deliverable in this series, D3.2(d), will be produced in May 2011 (M21), and will reflect what is expected to be an updated layout of the database.

2. Member State Information: Building a Database

The information currently available on the ceFIMS database comes from the Compendium compiled by the European Commission, data gathered through the Future Internet Award competition and data supplied directly to the ceFIMS Secretariat from FIF Members. This information will be expanded through periodic iterations of proactive information collection: (1) asking FIF Members and Award entrants for updates and information about new initiatives, and (2) cross checking content against other information sources. Furthermore, as national initiatives are launched at any time, when such information is received, it will be added to the database.

In order to create the basis for improved organisation and categorisation of the information, additional functionality has been added whereby each project/initiative is tagged with keywords (e.g. architecture, security, business, etc.). This allows users to browse the information **by Member State** and **by topic**. A **free-text search** box is also available for the database[3]. As more information is added to the database, this will become an increasingly important tool - a basis for the identification of gaps and analysis of synergies.

Entries received during the Future Internet Award competition provide a valuable source of information which is being qualified and if appropriate, added to the database. Entrants are asked to provide information on their initiatives in a structured entry form. This information offers an insight into a large number of national and regional activities. The information in these entries in many cases, is different from (and expands) the current information in the database, as they are typically not national programmes, but rather other types of activities; for example, projects financed from the national programmes, themselves.

For the first Award (December 2010), 31 entries were received from applicants in 12 Member States. The second Award (May 2011) attracted 24 entries from 10 Member States, while 19 entries were received for the third running of the Award (October 2011). The Entry Form was designed to fit easily with the structure and information headings in the database to allow easy extraction of information to the database format[4].

The information that can be gleaned from these entries (which is non-sensitive and is publicly available) provides a valuable body of new information that is being used by the project to supplement and add to

---

[3] Further search facilities are being investigated by the project in light of recommendations arising from the M12 review.

[4] The format and layout of the database is being updated in light of recommendations arising from the M12 review.

the existing available information on Member State initiatives. Section 4 of this report presents this information.

3. Capturing Information: Ongoing Activities

A series of measures are being actively undertaken in order to gather information and expand the information available to the project:

1. List of European research councils and funding agencies

The project is compiling a list of research councils and funding agencies across Europe. This list includes website links and contact points. This task is being undertaken by project partner NWO, leader of WP4 (Strategic Actions) in the project. The list will be valuable for future contacts when gathering data and will be useful for identifying the type and range of initiatives being funded by Member States.

Appendix A contains the latest list of research councils and funding agencies (as of December 2011).

2. Open Dialogue with Future Internet Forum Member State Representatives

Contact has been made with all Member States represented in the Future Internet Forum, to open a dialogue with them on this issue. FIF members are asked to review the information on the database from their Member States and to inform the ceFIMS Secretariat if the information should be updated or changed in any way. Member States who have not already provided information are asked to provide information by completing the provided template (template in Appendix B)[5].

The project is creating a dialogue with individual Member States based on this information in order to get more detailed information. The approach is to follow up with individual Member States through interviews and focused discussions at future workshops, to collect the type of information that cannot be easily gathered via structured forms. Such interactions will facilitate the exchange of best practices, the analysis of legal and operational barriers, and the identification of modalities for enhanced future cooperation. Furthermore, these activities offer an informal feedback mechanism for the identification of gaps, and the analysis of synergies and future cooperation opportunities. These methods will complement the factual, structured information collected via the forms for the database.

In order to enrich the information available on Member State initiatives, ceFIMS will investigate whether the initiatives—or their management organisations—maintain publicly accessible databases of projects (or other information sources, such as reports, compendiums, programme portfolio analyses, etc.)

---

[5] A new template reflecting the updated layout of the database will be available in March 2012

implemented within the scope of Future Internet. This is essential for the analysis of synergies; in particular, in the case of bottom-up programmes that do not describe in detail the topics that can be financed. The information uncovered through this process will also help pin-point research groups, capabilities, and test infrastructures.

3. Advisory Committee *(formerly entitled 'Steering Committee')*

An Advisory Committee for the project is in place. The composition rotates each semester in line with the Presidency of the EU. At the time of writing (December 2011), the composition of the Steering Committee for the first semester of 2012 (January – June) is envisaged as follows:

— Denmark (Chair)

— Cyprus

— Austria

— Romania

— Finland

— Germany

— Slovenia

— Switzerland

— *Portugal (ex-officio)*

— *Ireland (ex-officio)*

The Steering Committee plays an important role in gathering data during the project and acts as a bridge between the project and the FIF; in particular, when developing a dialogue with Member States on their Future Internet activities.

4. EU Future Internet Activities

This information has been extracted from the ceFIMS database and supersedes the information contained in D3.2(b).

4.1. Austria

4.1.1. FIT-IT

Overall Scope

FIT-IT – Programme Embedded Systems (estim. share of FI-relevance: 20-30%)
Several cooperative projects related to topics such as RFID, sensor networks, fault-safety communication protocols, software architecture for distributed systems, Quantum Cryptography, Wearable Autonomous Displays also.

FIT-IT – Systems on Chip (estim. share of FI-relevance: 5-10%)
Several cooperative projects related to topics such as System Architecture for Power Aware Wireless Sensor Network Nodes, Energy Harvesting for technical Devices, SoC for Advanced Multimedia Broadband Access.

FIT-IT – Semantic Systems (estim. share of FI-relevance: 30-35%)
Several cooperative projects related to topics such as Reasoning in web services, communication platform for machine-machine and human-machine interaction based on ontologies, High quality knowledge mining in the web, web wrapper technologies, Self Properties in Autonomous Systems, Semantic Business Process Management

FIT-IT – Trust in IT Systems (estim. share of FI-relevance: 25-35%)
Several cooperative projects related to topics such as Secure Network Protocols, Security Engineering, Middleware Architectures, Privacy and ID-Management & DRM,.

ARTEMIS-AUSTRIA (national Co-Programme of ARTEMIS-JTI-Initiative, estim. share of FI-relevance: unknown)
Various international large scale projects in the scope of Embedded Systems

Austrian electronic network – AT:net (estim. share of FI-relevance: unknown)
Unfocused programm umbrella covering topics such as: IT-based enpowerment of innovative high quality services and applications; enabling innovative, low-cost access to broadband infrastructres, support to use, penetration and digital integration if services

General funding (Basis-Programme/FFG; estim. share of FI-relevance: unknown)

FFG General Programmes use this instrument to support commercially relevant research projects which are run by companies, research institutes, individual researchers and inventors. Key funding criteria include project quality (e.g. technical risk, innovation potential), commercial exploitation (e.g. market experience and prospects), technical & financial feasibility and programme relevance (e.g. additionality) . The FFG's general funding is application-oriented and not limited to specific research topics or deadlines.

Broadband initiative (estim. share of FI-relevance: unknown)

Supports investments by private service providers in regions with no broadband connections. Programme will preserve the appeal of Austria as a business location in the long term and guarantee an efficient connection to the global electronic communication network. The aim of enabling people in the areas eligible for support to use the latest forms of ICT is to be pursued through the creation of a reliable, affordable, high-quality, innovative broadband infrastructure, which should in turn increase the regional penetration rate.

R&D Scope

— Network Architecture: FIT-IT/Embedded Systems; ARTEMIS, FIT-IT/Trust in IT Systems

— Service Architecture: FIT-IT/Semantic Systems

— Future Content Networks: FIT-IT/Semantic Systems

— Internet of "Things": FIT-IT/Embedded Systems; ARTEMIS, FIT-IT/Trust in IT Systems

— Trust, Security, Privacy, Identity: FIT-IT/Trust in IT Systems

— Future Internet Research and Experimentation: none

Expected Impact

Main activities are either designed in order to foster (cross)sectoral or domain/technology specific aspects of the national innovation system or follow a generic unspecified set-up. Impact expected is thus target towards the program-specific goals and needs, FI-relevant spill over effects are existing, yet currently impossible to measure

Involved Constituency

Constituency covers the whole range of Austrian Industry, Academia and research labs (in FIT-IT domains alone approx.: 1.200 stakeholders. A rough estimation of FI-relevant RTD key actors will sum up to approx. 50-100 RTD units.

4.2. Czech Republic

4.2.1. CESNET

Overall Scope

Current R&D activities in Future Internet area in the Czech Republic are systematically demonstrated mainly by those created and realized by CESNET, z. s. p. o. (the NREN operator in the Czech Republic) related to development of the Czech NREN CESNET2. Even if these activities seem to be performed by single legal entity in the Czech Republic only, due to close relation of this subject to the entire research and education community (CESNET was established in 1996 by Czech Universities and Academy of Sciences of the Czech Republic) and close co-operation with this sector, these activities are representing those in the Czech Republic well. It is necessary to mention, that there is a significant institutional support provided by Ministry of Education, Youth and Sports.

R&D Scope

The main goal of CESNET's activities is to design, set up and operate a new generation of network environment enabling effective collaboration of distributed research teams using advanced information and communication technologies. In order to complement this goal, the following particular R&D activities are maintained:

Network Architecture

— Research and verification of new principles and technological trends for building of advanced optical networks (advanced modulation formats, transmission speeds above 10 Gb/s)

— Evaluation and testing of deployment possibilities of advanced optical equipment (ROADM, VMUX, all optical switches), both in research and production networks

— Support of designs of modern optical networks based on wavelength division multiplexing (DWDM) or time division multiplexing (OTDM) for sharing of bandwidth on demand (BoD) and for better availability of E2E services

— Development of the experimental facility for testing new network concepts, technologies and network applications

— Design, testing and implementation of "open" photonic network elements

— Implementation of IPv6

Service Architecture

— Research and development towards providing required performance characteristics when communicating over fast long-distance networks

— Implementation of virtualisation for extending the capabilities of distributed computing, storage and communication infrastructures

— Support of emerging applications and services based on advanced communication demands requesting high level of services as large volume of data, speed of transmission, defined response time and reliability which is not possible achieved in standard shared IP

Trust, Security, Privacy, Identity

— Development of tools suitable for large scale, systematic and continuous network infrastructure and traffic monitoring

— Development of tools and politics in order to assure preventive and active protection of computers, networks and network services comprises consistent and efficient security incident handling

— Development and deployment of the infrastructure for federated sharing of services and resources

— Development of tools enabling mobility

In addition, CESNET is involved in research projects of FP7 as FEDERICA or PHOSPHORUS which creates new environments for testing new networking idea, designs and principles for future Internet.

Expected Impact

The impact of activities described above depends on the ratio of ICT knowledge transferred from R&D to the common life. From this point of view we could expect:

— the promotion of academic excellence in the related fields

— strengthening of the ICT industry

— increase of competitiveness of Czech Republic by diversification of GDP resources towards Knowledge Society

Involved Constituency

Taking into account that described R&D activities are related to the NREN development the involved parties are:

— CESNET, z. s. p. o. realising FI R&D activities

— Czech Government represented by Ministry of Education, Youth and Sports providing institutional support of research plan "Optical NREN and Its New Application", the framework for above described activities

— CESNET, z. s. p. o. as beneficiary of the institutional support

— NREN users comprising Academy of Sciences of the Czech Republic, Universities, research institutes, hospitals, libraries and other research and educational institutions

— Industry and commercial sphere having fair, non-discriminatory access (granted by law) to the results obtained

4.3. Denmark

4.3.1. Robobraille

Overall Scope

Key Information

Runs from: 2004 – ongoing (ongoing)

Website(s): http://www.robobraille.org

Summary

RoboBraille solves a universal problem regarding usability – the service makes otherwise inaccessible electronic documents accessible to people with visual or reading impairments.

It is an e-mail service which can convert digital text documents into either Braille or audio files. Translation processes which traditionally take a long time, making the user reliant on assistance from others, can now be accessed done in a matter of minutes by the user himself. The RoboBraille service is available free of charge to all non-commercial users, and users do not need to register before using it.

Objectives

— Inclusion of blind and visually impaired people as well as other groups, that are using computer techniques to improve their standard of living

— Help closing the gap of digital divide

⎯ Free service for non-commercial-use

Highlights

Originally a Danish service launched in 2004, RoboBraille was the subject of an eTEN market validation project conducted from June 2006 until December 2007 in Cyprus, Denmark, Ireland, Italy, Portugal and the United Kingdom with financial support from the European Commission. In 2010 german Language was added to the service. The RoboBraille eTEN project has demonstrated that RoboBraille is viable in its field.

Dissemination activities and the pilot programme have created awareness of the existence and capabilities of RoboBraille amongst individuals and commercial users across the European Community. RoboBraille validated by more than 1500 users in two pilot tests. Following each test users were asked to complete questionnaires devised to collected quantitative ratings (overall satisfaction with the service, quality-, accuracy- and relevance of the service), as well as qualitative information. The numeric ratings revealed a very high level of satisfaction with service amongst its users, demonstrating that RoboBraille is relevant, easy to use and of high quality. From a qualitative perspective the users have expressed that they perceive RoboBraille as a vital opportunity for blind and partially sighted people for mainstreaming in society.

In December 2007, the RoboBraille Service was awarded the 2007 Social Contribution Award by the British Computer Society in recognition of the importance of the service to the print impaired. In April 2008, the RoboBraille service was awarded the 2008 Well-Tech Award for Innovation and Accessibility.

In May 2008, the RoboBraille service was granted a multi-year grant on an amendment to the Danish State Budget, as well as one-off grant from the Danish Ministry of Education. Both grants are used to further improve the RoboBraille service to meet the needs of more user groups including the dyslexic, people with poor reading skills, people with cognitive disabilities, immigrants and illiterates.

R&D Scope

Based on experience from developing automated Braille and text-to-speech translation solutions during past 20 years, RoboBraille is a centralised, e-mail based translation service that automates the translation process, including any pre- or post processing steps required to convert between document types, formats and character sets.

Since the RoboBraille interaction model exploits e-mail, the solution is platform-independent and the only skill needed to use the service is the ability to send and receive an email with a document attachment.

The RoboBraille architecture is based on standard internet technologies and can be managed centrally. Consequently, the solution is robust, highly scalable, always up to date and can be operated by a minimum of efforts. The above mentioned use of digital technology permits non-commercial users to deploy RoboBraille free of charge.

Expected Impact

The RoboBraille service is based on e-mail which makes it possible for visually impaired and reading-impaired users to have electronic documents translated into either synthetic speech or Braille on demand. RoboBraille constitute an innovative alternative to the decentralised, user-centric Braille translation systems used widely to produce Braille at varying levels of contraction. Furthermore the possibility of choosing between Braille and audio empowers the user.

RoboBraille contributes to the establishment of an accessible and inclusive information society. The service promotes access to digital information for as many people as possible and furthers visually impaired and reading-impaired peoples' opportunity to obtain self-reliance, independence and self-sufficiency in daily life.

Involved Constituency

Within the robobraille-community there are partners from several countries, each partner responsible for funding the resources for the language, they are in charge of.

I. e. the partners have the following roles in the partnership:

— Supporting and servicing domestic users

— Dissemination activities such as articles, presentations, exhibitions, user visits, brochures and press work etc.

— Updating information to website in local language (the website is administered centrally in Denmark). Including information on relevant events, news etc.

— Finding new fundings, partners within the country

At the moment, there are 3 actual partners involved in the project:

— Sensus Aps, Denmark

— Medison Wojciech Maj, Poland

— HIlfsgemeinschaft der Blinden und Sehschwachen Österreichs, Austria

Also, there are partner organisation located in Cyprus, UK, Ireland, France, Italy, Lithuania, Portugal and Slovenia.

4.4. EU-level

4.4.1. CrowdSense

Overall Scope

Key Information

Runs from: March 2011 – March 2014 (36 months)

Website(s): N/A

Summary

Crowdsensing refers to the ability to detect the presence of pedestrians across an urban environment, and to react to that information accordingly. The CrowdSense project brings together two research teams from the University of Madeira (Portugal) and University of Oulu (Finland) to develop and deploy an urban infrastructure for pedestrian crowdsensing and modelling. The infrastructure will rely on a metropolitan 6LoWPAN backbone bringing together WiFi and Bluetooth hardware to sense mobile devices. By exploiting pedestrians' mobile devices this urban infrastructure will:

i) sense pedestrian presence and movement across the city, and

ii) engage with pedestrians to deliver information services.

The project aims to develop an economy of services centred on real-time CrowdSensing, and will deploy a small number of such pilot services.

Objectives

— Deploy infrastructure for capturing pedestrian movement across Funchal (Portugal)

— Develop tools to analyse and predict pedestrian movement across Funchal

— Build services that exploit real-time CrowdSensing

Highlights

— CrowdSensing is highly innovative, and has the potential for developing commercially viable services and an economy centred on real-time CrowdSensing in cities.

— The project makes innovative use of 6LoWPAN, WiFi and Bluetooth for developing and urban sensing infrastructure.

— The project consortium consists of a number of public entities in Madeira: the public transport operator, the office of Regional Economy, the Tourism Board, the electricity company in Madeira.

In addition, a number of key industry players are actively collaborating with us: Nokia, IBM, Liidea (urban transport modeling), Bluegiga (hardware SME).

⎯ The use of 6LoWPAN for the sensing backbone minimises the energy costs associated with the infrastructure. In addition, the infrastructure is expected to scale well with increased crowd sizes.

⎯ Two relevant pilot implementations exist in place. In Madeira, a pilot scheme has developed part of the sensing platform (Bluetooth only) in collaboration with the public transport authority for delivering information to passengers across a high-frequency line. In Oulu, a prototype 6LowPan deployment coupled with WiFi has been used to demonstrate CrowdSensing on a small scale.

⎯ This project brings together researchers from two different countries with a diverse background (computer science, network engineering, intelligent transport), and a number of public and commercial institutions.

R&D Scope

The project will utilise 6LoWPAN for its sensing backbone across the city. This will allow for flexible deployment and routing in an urban setting.

Expected Impact

The most significant expected impact is the ability to demonstrate that an economy of services can be developed around the concept of CrowdSensing. While this project will make a single deployment in Portugal, it aims to demonstrate that commercially viable services will be possible in other European locations.

Involved Constituency

The main collaboration in this project is between two teams at the University of Madeira and the University of Oulu. The principal investigator holds positions at both organisations, funded by the Ministry of Education in Portugal and the Academy of Finland. Each team is currently working on closely-linked pilot studies, and this project aims to unify these efforts. Each of the two teams brings their own industrial partners and long-standing collaborators.

The success of the planned work is guaranteed by the involvement of the public transport authority and the public energy company in Portugal. This will ensure that development and crucially deployment of the infrastructure proceeds with minimal delays.

The organisations currently involved in funding this work are: FCT (Portugal), IBM, Nokia, Academy of Finland, TEKES (Finland). In addition, two SMEs are also involved: Liidea (urban transport modeling), and Bluegiga (hardware SME).

4.4.2. GEYSERS

Overall Scope

Key Information

Full name: Generalised Architecture for Dynamic Infrastructure ServiceS

Runs from: Jan. 2010 – Jan. 2013 (36 months)

Website(s): http://www.geysers.eu

Summary

The current decoupling between applications and network layers leads to inefficient resource utilisation and over-provisioning, where the network connectivity is not tailored to the cloud dynamics. Thus, the convergence of the IT world with the optical network world is being addressed by GEYSERS. This project re-qualifies the interworking of legacy planes by means of a virtual infrastructure representation layer for optical network and IT resources. It also enables a new business model where the resources of Infrastructure Providers are partitioned and dynamically offered as a service to Virtual Networks Operators. GEYSERS's IT resources, consisting of storage and computational capacity at users' premises, are fully integrated with the optical network services procedures, both at the infrastructure-planning and connection-provisioning phases. Thus, GEYSERS is able to support 'Optical Network + Any-IT' resource provisioning seamlessly and efficiently.

Objectives

— Provide a novel architecture that enables infrastructure providers, network operators and application providers to participate in new business scenarios. Furthermore, complex services, with complex attributes, and strict bandwidth requirements can be offered economically and efficiently to users and applications. This is achieved by providing an enabler for the integration of Dynamic Optical Network services in Cloud Computing scenarios.

— Specify and develop mechanisms that allow infrastructure providers to partition and virtualise their resources (optical network and/or IT), compose specific virtual infrastructures and offer them as a service to Virtual Network Operators. This will be done overcoming the current limitations of networks/domain segmentation, and will support dynamic and on-demand changes in the virtual infrastructures.

— Specify and develop an enhanced Network Control Plane for the optical infrastructure, by extending standard solutions (ASON/GMPLS and PCE). This NCP is able to couple optical network

connectivity and IT services automatically and efficiently, and provide them in one single step, dynamically and on-demand, including infrastructure re-planning mechanisms.

Highlights

GEYSERS novel architecture will allow the emergence of a new set of services driven by industry demands and innovation behind cloud computing. Thus, a complete set of use cases, addressing the actual needs from industrial partners in the project, has been considered as a starting point. GEYSERS will inherently support cloud computing, with open, unified, and standard user-network-interfaces that support vertical SLAs, as well as the latest advances in network virtualization that ranges across network devices and includes storage and computing components. GEYSERS will use virtualisation techniques to offer virtual infrastructures, composed by optical network and IT resources from different providers, and rent them out to virtual operators. As resources are exchanged and used by third parties, AAI (authorization, authentication Infrastructure) is a key issue. AAI is addressed through a framework for heterogeneous network and IT resource provisioning and SLA mapping. It provides a consistent support for on-demand provisioning in a heterogeneous resource environment, spanning from the infrastructure to the Control Plane up to the Application layer, and considering the SLA of the user/applications. On top of this, GEYSERS deploys an enhanced Network Control Plane (NCP) capable to jointly provision network and IT resources in one single step, plus capabilities to request the re-planning of the virtual infrastructure resources. Thus, cloud infrastructures composed of network and IT resources can be dynamically provisioned.

The virtualisation techniques implemented in GEYSERS and its enhanced control plane procedures, will optimize the resource usage and transform the end-to-end seamless Network + IT transport service in "end-to-end energy efficient". This is achieved by minimizing the energy consumption metrics along the end-to-end path and selecting the more efficient IT end points. The fact of creating on-demand virtual infrastructures to offer cloud services is time-strategic and will be validated in a pan-European large scale testbed allowing a large amount of different use cases.

R&D Scope

GEYSERS will develop a new layer called LICL (Logical Infrastructure Composition Layer) that will be in charge of decoupling current vertical business models from telecom operators by creating virtual infrastructures from resources of different providers. This is a major innovation, since the LICL will compose of virtual infrastructures based on optical network and IT resources. It will also provide an interface to the NCP for its provisioning. This NCP provisioning will be a major advance due to the fact that it contains IT information in its internal procedures, and will change the way cloud infrastructures are built and provisioned. Both developments will facilitate the deployment of better services that eventually may impact the European society. These major developments are also using, as reference technology, some of the latest advances and outcomes from other successful European research projects. These

projects are aimed at leveraging the outcomes of past (i.e. Phosphorus, 4WARDS, Reservoir) and present projects with whom GEYSERS is collaborating (i.e. ETICS, Strongest, Mains). Globally, GEYSERS aims at impacting the European scale as opposed to regionally, since its goal is to provide mechanisms to make use of resources spread over Europe by telecom and IT infrastructure provides.

Expected Impact

GEYSERS not only provides new developments in a particular set of innovative areas (which will generate technical and business impact), it also provides novel architecture that establishes a breakthrough in the design, implementation and integration of the Future Networks within cloud computing services.

The innovation behind GEYSERS developments will facilitate the migration of legacy telecom roles to a new set of roles (Physical Infrastructure Provider, Virtual Infrastructure Providers and Virtual Infrastructure Operator). This will facilitate the entrance of new actors in the ICT environment while enabling telecom operators to access new markets, and strongly impact new business models, moving their business towards higher value application layers (IaaS). The main technological and business impacts are related to:

— Provide mechanisms to compose and (re)plan infrastructure resources on demand. This will lead to an optimized cost-efficient use of infrastructures, being a key differentiating factor in the business of providing dedicated support of highly-IT reliant distributed mission critical enterprise applications.

— Enable Network Operators to efficiently couple both network and IT infrastructures. And to provide enhanced complex end-to-end services (i.e. anycast), by dynamically provisioning optical network and IT resources to Cloud Providers, with dynamic wavelength-allocation functionalities and capabilities.

— Provide a pay-per-use and pay-as-you-grow business model that will lower investment risks and greatly support Virtual (and quasi Virtual) Network Operator business, and involve telecom operators within new flexible cloud business scenarios.

With a green scope, the novel virtualisation techniques together with the enhanced control plane procedures implemented, will optimize the resource usage by minimizing the energy consumption along the path and selecting the more efficient IT end points. These set of innovations are very strategic, since the business model behind may reduce CAPEX investments and allow new companies to become or behave as google or amazon do. Interoute is currently offering this IaaS (Infrastructure as a Service) service model, but with manual procedure and with a lack of innovative services. GEYSERS tools are expected to positively impact Interoute's business procedures.

Involved Constituency

The partners in the GEYSERS consortium have all the necessary skills and proven expertises covering the different topics addressed in this project, and are complementary. The consortium is driven by industry interests, who initially collaborated on the definition of the GEYSERS use cases. These use cases have been composed by the industrial partners: IT service providers (SAP), network operators (TID, TP), international carriers (IRT) and optical manufacturers (Adva, Alcatel-Lucent). The industry merged their needs and interests together to compose the GEYSERS use cases, using a bottom-up approach. Closely collaborating with the main industrial partners we have three SME's, one supporting the administrative tasks of the project (Martel) and two more (Nextworks, Lyatiss) with specific interests and know-how skills in GEYSERS. These two SME's will emerge as key partners on developing software solutions and providing support to the main industrial partners. Moreover, GEYSERS has a complete set of well known research institutions (PSNC, I2CAT, INRIA, IBBT) and renowned universities (UEssex, UvA, AIT, TUBS) with full research expertise on the topics being addressed along the project, as well as a non-EU academia partner(Indian Institute of Technology). These partners form a significant critical mass and have all the capabilities, commitments and balance to pursue and realise the mid/long-term GEYSERS vision of the Network of the Future. In addition, the fact of deploying the project outcomes in a large pan-Europan testbed will facilitate the dissemination activities and interaction with the end users.

4.4.3. IRMOS

Overall Scope

Key Information

Runs from: Feb. 2008 – Jan. 2012 (36 months)

Website(s): www.irmosproject.eu

Summary

Future Internet applications raise the need for environments that can facilitate real-time and interactivity without major modifications in the application domain. To this direction, IRMOS Project developed a New Generation of Service Oriented Cloud Computing Environment that enhances current service oriented infrastructures with coherent and consistent real-time attributes at various levels (application, network, storage, processing), which has been one of the reasons that made the project unique comparing to other EC funded projects. The aforementioned environment also provides tools for facilitating the adaptation of applications and business processes to the underline virtualized cross-organisational infrastructure, while it also considers the full lifecycle of service-based systems including service engineering, performance estimation and modelling, SLA (re-)negotiation and management, service provisioning, live-migration, monitoring and evaluation. QoS parameters at application, platform and infrastructure levels are given specific attention as the basis for provisioning policies in the context of temporal constraints. Three

application scenarios (namely Interactive Real-time eLearning, Digital Film Postproduction, Virtual and Augmented Reality) have been used to demonstrate the operation of the IRMOS platform and evaluate its effectiveness.

Objectives

— Facilitate real-time interactivity in SOIs, through a platform of services which handles complexity and provides semantic representations of systems in order to efficiently allow for scalability, interoperability and adaptation, thus enabling the design, development, deployment and operation of applications that require time-guaranteed responses.

— Enable an intelligent network infrastructure that not just manages the network bandwidth, but also takes into account several QoS aspects like delay and jitter, when network paths for a service have to be selected, and enables automated SLA negotiation and monitoring.

— Consolidate management and control of the infrastructure and services at all points in the value chain by providing an integrated optimisation approach at various levels, including inter-organisation business processes and SLAs, intelligent networking and virtualisation techniques.

Highlights

Although IRMOS was initiated prior to the general acceptance of the cloud SPI model (i.e. SaaS, PaaS, IaaS), the architecture of the platform maps directly onto the aforementioned cloud model, positioning the IRMOS project at the leading edge in Cloud Research as the first EU funded project developing an innovative cloud platform providing solutions for all 3 cloud services models (IaaS, PaaS and SaaS) with the focus on real-time and interactivity.

The results of the IRMOS project are software implementations and frameworks as well as methodologies and best practices on how to engineer applications for a real-time service oriented infrastructure. Software implementations and frameworks have been published (the majority as open source in Sourceforge) and are summarized around three main areas:

1. Service Engineering, with outcomes that enable the provision of an environment for application developers to create models that describe real-time applications based on specification languages and following a methodology on how to create and deploy real-time interactive applications on SOIs.

2. Service Management, with specific services (e.g. workflow and SLA management, monitoring, evaluation, etc) that support applications with real-time attributes: from event and message driven coordination (for runtime adaptability of resource provisioning estimation and decision making) of service networks to synchronized interaction between resources.

3. ISONI (i.e. Intelligent Service Oriented Network Infrastructure) that enables a QoS-guaranteed infrastructure for computing, storage and networking through real-time scheduling of virtual machines, sophisticated resilience mechanisms (e.g. live migration and redundancy), real-time scheduled storage

access, as well as flow control, path management and supervision to allow the provision of QoS-guarantees on virtual network resources.

Besides the software components (more than 50) that have been published as open source and some of which have been considered of major importance - for example the IRMOS real-time scheduler will be integrated into the Linux main-stream kernel, within the framework of IRMOS, we have also developed 3 Patents, made 37 Contributions to Standards (e.g. ETSI Cloud), published 69 Peer-reviewed Articles (including a Best Paper Award in IEEE SOCA and publications to journals with high impact factor such as IEEE Transactions on Computers, IEEE Transactions on Industrial Informatics, Future Generation Computer Systems, etc) along with 5 Whitepapers, and organized 7 workshops / tutorials in scientific conferences.

The outcomes of IRMOS project and hence the complete service infrastructure have been demonstrated through live demos of the application scenarios from the educational, automotive and film domains. Such demos have also been shown in various public events (e.g. ICT2010, Bell Labs Open days, etc), while invited presentations (e.g. in EU-Japan Symposium) have been perceived with great interest by the participants. In ICT2010 Gee Rittenhouse (Director Research Bell Labs) said: "Such an environment could greatly impact a number of application domains", while in Grids, Clouds and Service Infrastructures ETSI Workshop, Andreas Ebert (Microsoft Regional Technology Officer, EU) highlighted the importance of one of the project outcomes: The Blueprint that guides the application developers on how to engineer applications for clouds and Steve Clifton (CTO of Animoto) mentioned "the value for QoS guarantees in real-world scenarios, such as Animoto". Nevertheless, these applications only show how the IRMOS platform can be used and demonstrate the benefits, but the potential applications for this are almost endless. Taking into consideration that future internet scenarios from different application domains (e.g. healthcare, finance, estimations and forecasts on climate conditions, analysis on pollution effects, etc) require the operation of an environment that provides guarantees on the offered quality level of the services, as well as that most of the future internet applications raise the need for interactivity, IRMOS project contributes by providing research outcomes towards this direction. Moreover and regarding fast and secure communication, the developed ISONI framework enables the provision of virtualized network resources meeting the QoS requirements refer to of the user / application. Through ISONI, fast and secure communication is achieved given that the aforementioned requirements may refer to delay, jitter and bandwidth.

R&D Scope

Various innovative developments have been completed during the project's lifetime with regard to QoS guarantees provision that enable Future Internet applications (most of which are real-time and interactive) to be executed on service platforms. The main developments refer to:

— Real-Time QoS Specification: specification language and associated toolkit for the specification of applications and application service components considering both structure and real-time QoS.

⎯ Event Prediction: QoS oriented service engineering methodology and models for predicting QoS requirements contingent on application and resourcing events considering temporal profiles of application service components deployed on virtualised infrastructures.

⎯ Dynamic SLA Negotiation: SLA negotiation and management services supporting the dynamic negotiation of Application-SLAs considering customer requirements, and dynamic discovery of resource providers (Technical-SLAs) through automated processes of the platform and re-negotiation.

⎯ On-Demand Resource Provisioning: Services for application service components on virtualised infrastructures through combination of intra and inter the virtual service networks and service-based management wrappers enhanced to support temporal profiles.

⎯ QoS Event Monitoring: monitoring services for measuring QoS at both application and infrastructure levels targeting trigger events for runtime adaptability of resource provisioning estimation and decision making.

⎯ QoS-guaranteed infrastructure for computing and storage: Provision of a virtualized infrastructure integrating real-time scheduling of VMUs through a Linux real-time scheduler, sophisticated migration and redundancy capabilities as well as real-time scheduled storage access.

⎯ QoS-guaranteed virtualized networking: Virtual links enabled through connectivity approaches as well as path management and supervision along with QoS-aware flow control and infrastructure monitoring.

Expected Impact

The project outcomes target different domains: from modelling and service engineering to advanced networking technologies. The implemented services and frameworks have high potential for market uptake and it is within the industrial (e.g. Alcatel-Lucent, Telefonica, Xyratex) partners' plans and interests to reach commercial exploitation.

IRMOS platform enabled new and improved products for the application partners: Digital Film Technology GmbH (used to be Grass Valley Germany GmbH) will integrate the outcomes into product line while eXact Learning Solutions will integrate the Virtual World functionalities into eXact Learning Suite. University of Stuttgart will exploit various components of the Virtual and Augmented Reality application developments (COVISE) through Visenso spin-off. Other outcomes are either commercialized – e.g. application performance models (from IT-Innovation), included in industrial partners portfolios (e.g. Alcatel-Lucent, Xyratex, Telefonica) or released as open source (e.g. mapping service by National Technical University of Athens, real-time scheduler by Scuola Superiore Sant'Anna). Furthermore, new projects (e.g.VISION Cloud, OPTIMIS) are building on the IRMOS results. Based on the above, within the next years, commercialization of our innovative research outcomes is foreseen while we would also highlight the influence to standards..

Involved Constituency

A particular strength of IRMOS is its well-balanced consortium with complementary abilities to fulfil all the RTD, Innovation, Demonstration, Training and Dissemination activities, which is necessary to run a successful Integrated Project. Eleven partners belonging to 6 European countries (DE, UK, GR, IT, NO, ES) constituted a group of academia and research centers, equipment manufacturers, international enterprises, and users offering wide expertise and technical excellence of working cooperatively. Academic partners (National Technical University of Athens, University of Stuttgart, SINTEF   Semantics, IT Innovation – University of Southampton, Scuola Superiore Sant'Anna) contributed to virtualization technologies, SLA and workflow management, modelling and specification approaches as well as real-time scheduling. While a set of industrial partners (Xyratex, Alcatel-Lucent, Telefonica I&D) contributed to storage-related technologies, intelligent networking and development of framework services, the consortium included industrial partners as leading end-users in the corresponding application domains. These refer to: eXact Learning Solutions (used to be GIUNTI Labs), Digital Film Postproduction (used to be Grass Valley Germany) and Deutsche Thomson.

4.4.4. MAINS

Overall Scope

Key Information

Runs from: Jan. 2010 – Jan. 2012 (24 months)

Website(s): http://www.ist-mains.eu/

Summary

Mains project will design, develop and implement a novel metro architecture supporting sub-wavelength granularity. It addresses requirements of Network of the Future at a metro level by proposing a novel solution leveraging combination of ring and mesh sub-wavelength switched metro network technologies, fully controlled by and advanced control plane. It will develop an extended GMPLS control plane capable of controlling and provisioning end-to-end connectivity in a sub-wavelength switched network. The MAINS solution will also propose a novel service to network interface to enable direct access to network services at sub-wavelength granularity directly from the application layer. Furthermore, the MAINS project will evaluate its outcome in hybrid mesh-ring testbed that features innovative sub-wavelength switching nodes from University of Essex and Intune. Finally, MAINS will perform a field trial involving real users in Cyprus, which will demonstrate a virtual PC application over sub-wavelength network as a proof-of-concept. MAINS outcome will allow efficient deployment of distributed application servers in a metro network by means of a novel service to network interface and an extended GMPLS control plane. As a result, both CAPEX and OPEX are reduced, while enhanced capabilities are achieved.

Objectives

— Develop standardised web-service network interfaces

— Validate the improved performance of new innovative Optical packet switched networks with respect to current networks

— Demonstrate in national testbeds

Highlights

Intune's involvement in the MAINS project has led to the creation of the Irish Government's Exemplar Network Test-bed.

http://www.dcenr.gov.ie/Communications/Communications+Policy/Exemplar+Network/

The Exemplar Network Test-bed is a digital village of various SME's, MNO's, academia and service providers and features the world's first deployment of OPST (Optical Packet Switch and Transport) technology, the same innovations developed in MAINS.

Exemplar is the world's first web programmable network infrastructure deployment and is the world's first scalable network infrastructure to guarantee QoS. Exemplar can be directly programmed, controlled and re-configured by internet software applications in real time, without human intervention and without interfering with any other network services.

The purpose of the Exemplar digital village is to stimulate growth and to provide a platform for companies and academia to deploy disruptive new innovations at scale. It's purpose is also to educate communities and provide a clustering and collaboration eco-system. Exemplar is already successful in its remit and has integrated web enabled network API's directly with SME & MNO Internet applications and use-cases. It has increased jobs, attracted investment and proven that national telecoms networks can be opened up and directly fused with new future internet software applications and use-cases..

R&D Scope

There are 3 major innovations being demonstrated on the OPST technology and Exemplar Testbed:

[1] A truly dynamic optical layer that is packet responsive – the technology underpinning the Testbed equipment is based on Optical Packet Switching and Transport (OPST).

All existing networks underpinng todays internet are based on fixed optical circuits. This leads to long lead times for new services, a low level of fibre utilisation (<5% in dense metros), and an inability to respond to what is happening at the packet layer which results in an un predictable and uncontrolled quality of experience for the internet user.

OPST uses tunable lasers that tune in nanoseconds to make the optical layer run as an optical packet switch fabric, which inherently also performs the transport function. This allows the cost of the internet

to drop because the infrastructure can utilise the fibre assets much more cost effectively, and it enables a Quality of Experience metric to be applied to the network by closely matching physical packet flows to logic packet flows and classes of service.

[2] The world's first network switches that are web programmable

Each fibre ring in the testbed acts as a single switch with one interface. This interface is built using the most modern software used in Web Services today: RESTful Web Services with XML. For the first time, the network now speaks the same language as the IT world, the Cloud, Mobile devices etc.

The equipment has no traditional Telecoms software such as SNMP or TL1 for the control and management system. It uses web servers on each network card and these cards peer together using web services to form a required service. This opens the internet infrastructure up to the programming communities and for the first time allows them to add the network infrastructure itself into the service delivery chain.

[3] The testbed was demonstrated at the Telemanagement World Forum (TMF) conference in May 2011 in Dublin by a consortium of companies: BT, Openet, Amartus and Intune. Openet and Amartus are the first companies in the world to embed the new network API (Application Programming Interface) into their own products and demonstrate how their web services applications can now control the quality of service directly on the network infrastructure. The demonstration involved an end-user using a web browser to increase the quality of service of a video-based application on-demand, and seeing the resulting improvement, and billing on-demand of that service inside their browser.

The implications for future internet applications are highly disruptive and have high value propositions for the businesses involved. This is because a new era of highly interactive, real-time applications with video can be truly rolled out, allowing service companies and users to control the network on-demand for quality of experience, and bill for that priveledge. It will also enable the Private Cloud to work in a dependable way, and the more efficient use of resources will then drop the cost of the Public Cloud and internet usage for all citizens.

Expected Impact

The key innovations developed in MAINS have already been deployed in Exemplar, will be replicated in various other countries around the world in 2012 and beyond.

The OPST infrastructure is equipped with dynamic optics and optical packet switched technology. This enables the physical layer to be dynamically responsive to the application layer, which in turn enables software applications to directly control the network in real-time. This is a paradigm shift in Internet technology. It also means that the network layers and devices can be converged into a single distributed network object, which significantly reduces the capital and operational costs, including the energy costs of future networks. It also significantly accelerates new service uptake and the general productivity of the ICT and smart city environments. As the network is web-enabled, ICT and Smart City web services

applications can be directly fused as a single architectural object. ICT and Networks are no longer abstracted from each other in OTT (Over the top) type models but come together in NaaS (Network as a Service) type models.

OPST also enables new advances in media content delivery and cloud services.

Media Content Delivery: A media application can directly request the Exemplar OPST network for a unicast service, of a certain bandwidth, and of guaranteed QoS and deliver perfect high definition picture quality on demand.

Cloud services: Cloud Services have recently absorbed many PC type applications including email, productivity and customer relationship management. These applications are generally considered low user interactivity type applications. High Interactive multi-media PC applications such as video editing, computer aided design and games consoles have yet to transition into the cloud. The bottleneck is considered to be an optical networking problem and not a cloud server problem as the main technical hurdles in enabling multi-media cloud applications are the number of O-E-O's (optical electrical optical conversions) in the network which contribute the unwanted latency, jitter and packet loss to the internet services. Dynamic Optics based network architectures, such as the Exemplar Network, reduce the O-E-O's in the network to its lowest possible level and therefore enable a new generation of advanced cloud services.

Involved Constituency

The MAINS Project partners include

— Telefonica Investigacion y Desarrolo (Spain) – Co-ordinators and telecoms service provider

— Intune Networks LTD (Spain) – telecoms equipment vendor

— Nextwork (Italy) – network management software provider

— Primtel (Cyprus) – telecoms service provider

— Universidad Autonoma de Madrid (Spain) – Research University specialising in networks

— University of Essex (UK) – Research University specialising in networks

5 EU States are represented in this MAINS programme.

The Exemplar Network Testbed in Ireland is funded by the Irish Government's Department of Communications, Energy and Natural Resources for phase 1. Phase 2 will be a Public Private Partnership funded partly by Government and partly by private enterprise, and currently there are 15 private enterprises involved in final talks to secure the next phase of funding.

Current users in the Exemplar Testbed include: BT, Microsoft, IBM, Imagine Telecoms, Openet, Amartus, 5 Irish Universities and several smaller sized companies and organisations.

The MAINS consortium have visited the Testbed in Dublin, Ireland and analysed the architecture and performance of the network as part of the research performed in the programme.

The Testbed is open access, and any European SME, Corporation or Research Institute may apply for access to the Testbed and Lab space available. This is free of charge but they must provide their own workstations and staffing to perform tests in the lab space in Dublin.

The now connected to the Geant Network http://www.geant.net/pages/home.aspx and the entire European research community.

4.4.5. NOBEL

Overall Scope

Key Information

Full Name: Neighbourhood Oriented Brokerage Electricity and monitoring system

Runs from: Feb. 2010 – August 2012 (30)

Website(s): http://www.ict-nobel.eu/

Summary

The NOBEL project will build an energy brokerage system with which individual energy consumers can communicate their energy needs directly with both large-scale and small-scale energy producers, thereby making energy use more efficient. We have set an ambitious goal: based on previous studies, we expect our brokerage system to achieve a 30% reduction in energy consumption. The brokerage system will use a middleware system to communicate relevant data and IPv6 technology to interconnect the middleware with sensors and energy meters on individual devices.

The key to NOBEL's efficiency improvement is that users become sources of both energy and information. The information allows the energy system to better adapt the amount of electricity in the network to the real time demand. The performance of the entire system is enhanced by exploiting the locality of the processes in monitoring and control that normally do not consider the detailed behaviour of the actual consumers.

Objectives

— Information retrieval. NOBEL uses state of the art technologies to dynamically obtain and process information from current available installed equipment. This will be achieved by implementing bidirectional communication with all involved entities, process the information with respect to consumption and production and automate decisions to be made network-wide.

— Information distribution. NOBEL develops a service oriented framework that will allow easy flow of information among the prosumers and the enterprise systems in order to foster more energy

efficient processes. This implies the development/extension of a middleware – i.e. a set of application independent services – that enable the distributed capturing, filtering and processing of the energy related data. The same services will ease enterprise wide inclusion and allow for better cross-layer collaboration which will lead to holistic optimisation strategies.

— A cooperative system. NOBEL develops cooperation approaches for all entities involved. This assumes cooperating objects at device level, at the energy brokerage system, at service level etc. We plan to tackle interoperability in heterogeneous environments and use the Internet Protocol for communication e.g. at smart meters, etc- in order to reach unprecedented levels of granularity.

Highlights

In existing approaches electricity is distributed to the final users according to its expected estimated demand, usually precomputed yearly. Such non-dynamic approaches, are difficult to evolve and cannot accommodate changes in the system e.g. on production side, on consumer side etc. By having a cross-layer and open information flow among the different actors involved we can make better and more timely predictions, and inject new dynamics in the system (e.g. locality of energy production, direct interaction of business processes with the energy management systems etc) that can eventually lead to better energy management and achieve better energy savings.

NOBEL will focus its efforts in designing a new Neighbourhood Oriented Energy Monitoring and Control System. This solution will help network operators to improve last mile energy distribution efficiency by integrating operators' requirements and by enabling bidirectional interaction between them. The NOBEL approach opens possibilities of the future open energy market, enabling not only the monitoring of the energy consumed by users, but also the monitoring of the energy produced i.e. implementing in real life the concept of "prosumer", producer+consumer.

The project counts with with some of the most relevant actors in IPv6, cooperative objects – SICS and University of Duisburg (UDE), and offers the opportunity to deploy state of the art ICT in a large scale scenario: a network (smart grid) of 5.700 smart meters.

R&D Scope

NOBEL's real-time monitoring and optimization of energy consumption requires information from a large number of different embedded devices. These devices need to be able to communicate using a common communication standard. In the area of sensor networking, the adoption of IP as the layer 3 protocol to connect wireless sensors has been slowed down by the common belief that IP is too large to fit on a memory constrained device. SICS uIP embedded IP stack previously showed that IP was lightweight enough to be used even on the most memory constrained devices. uIP was later extended with fully certified IPv6 support, making it the smallest IPv6 Ready stack available. uIPv6 has a code size of 11.5 Kbytes and requires less than 2 Kbytes of RAM.

By using an IPv6-compliant protocol stack, the sensor network can be easily integrated into IPv6 networks and leverage existing tools, protocols, knowledge and networking infrastructure. The IP-enabled sensor network can be managed with existing or readily available tools. Knowledge of IP network management can be applied to the sensor network. Additionally, development and programming of the sensor network does not require learning new network protocols or paradigms. Recent work has shown that by using a power-saving MAC protocol in the sensor network, IP-based sensor networks are as power-efficient as sensor networks based on proprietary or specialized mechanisms. For embedded devices that communicate wirelessly, the power consumption of the radio has been a major and therefore standardization work within the 6LowPan group has reduced the header overhead of IPv6, thereby reducing part of the power consumption.

Before mainstream adoption of IPv6 for resource-constrained embedded devices some issues remain to be solved: the definition, implementation and standardization of suitable routing protocols as well as a suitable MAC layer.

NOBEL technology will be deployed in a large scenario for 6 months, involving 5.700 users in the village of Alginet (Spain). The deployment will not only affect to the smart grid infraestructure, but also to the public ligthing monitoring anc control system.

Expected Impact

In the area of ICT, technological leadership is frequently maintained by the groups of people that initially create a technology. Since the consortium counts with some of the most relevant actors in IPv6, cooperative objects – , SICS and UDE have together almost 50% of all European papers at the most prestigious sensor networking conference, ACM SenSys – and in general the Internet of things, acquiring and maintaining a strong leading position can significantly strengthen Europe's position in the ICT-enabled energy efficiency sector. By providing fundamental technology to enable the vision of a neighbourhood oriented electricity brokerage system, the NOBEL project will help to establish a leading position.

In the future many devices including smart meters are expected to provide their functionality as a service over an event based infrastructure. Devices Profile for Web Services (DPWS) is a protocol attempting to fully integrate devices with the web service world. DPWS defines a minimal set of implementation constraints to enable secure web service messaging, discovery, description, and eventing on resource-constrained devices. Defining profiles for energy measurements in NOBEL will be a contribution to this standard related activities.

In the same context, 6LowPAN is an acronym of "IPv6 over Low power Wireless Personal Area Networks", and is the name of the working group in the Internet area of the Internet Engineering Task Force (IETF). 6LowPAN has published RFC4944, which specifies how IPv6 packets are compressed and transmitted over a 802.15.4 link. This allows IPv6 to be used for a variety of low-power radio systems in a standardized way.

As presented in previous sections, partners of the consortium are active in the respective standardisation groups and fora.

Last but not least, the IPSO Alliance has the objective to increase the base to support and supplement the IP on every device. The IPSO Alliance performs interoperability tests, document the use of new IP-based technologies, conduct marketing activities, and serve as an information repository for users seeking to understand the role of IP in networks of physical objects. The IPSO Alliance was founded by partners (SAP, SICS) of the NOBEL consortium and we expect NOBEL results to be of high interest for the IPSO Alliance.

As a consequence of the efficiency in energy consumption reduction and minimising of the lighting pollution and reduction of CO_2 gas emission will be achieved, resulting in a notable improvement on quality of life for EU citizens. In addition, considering the current economical situation and the dependencies on energy resources, providing a tool for a better management and monitoring of the electricity injected in our local networks, as well as information tool for citizens, will help providing stability to the householders and service suppliers budget.

Involved Constituency

The NOBEL consortium is composed of a balanced team of complementary organisations including industrial partners and research centres, universities and embedded software developers in order to gather the necessary expertise required by the project.

Each organisation provides its unique expertise: research centres and universities contribute with their analysis, methodological and dissemination support and development work, the industrial companies bring into the group their knowledge and leadership in production and development of embedded tools, energy efficiency and business systems, and the embedded software and middleware developers contribute with their specific competences to make the NOBEL approach possible.

The consortium comprises 6 partners from 4 countries:

— ETRA INVESTIGACIÓN Y DESARROLLO S.A .(ES)

— SAP AG (DE)

— SWEDISH INSTITUTE OF COMPUTER SCIENCE (SE)

— COOPERATIVA ELÉCTRICA ALGINET (ES)

— CENTRE FOR RESEARCH AND TECHNOLOGY HELLAS (GR)

— UNIVERSITAET DUISBURG-ESSEN (DE)

4.4.6. OneFIT

Overall Scope

Key Information

Full name: Opportunistic networks and Cognitive Management Systems for Efficient Application Provision in the Future InterneT

Runs from: July 2010 – Dec. 2012 (30 months)

Website(s): http://www.ict-onefit.eu/

Summary

The OneFIT project will develop and validate the vision of opportunistic networks that are managed and coordinated with the infrastructure, by advanced cognitive systems. Validation will show enhanced wireless service provision and extended access capabilities for the Future Internet, through higher resource utilization, lower costs, and management decisions with a larger "green" footprint. OneFIT leads to better services for the user and creates market opportunities for manufacturers, operators and service providers. OneFIT efficiently addresses several technical challenges, and evolves, bundles and exploits different types of approaches, ranging from dynamic spectrum management and infrastructure-less networks to social networks.

Objectives

— To design the Functional and System Architecture that will address the requirements deriving from the business and provision scenarios,

— To develop the appropriate "Control Channels for the Cooperation of the Cognitive. Management Systems" (C4MS) and realize standardization activities, and

— To develop the appropriate algorithms for enabling the opportunistic networks and realize the necessary validation activities for providing evidence on the efficiency of opportunistic networks and cognitive management systems for application provision in the Future Internet era.

Highlights

— The elaboration on business and application provision scenarios, derive requirements and technical challenges, and provide validation criteria that will drive the adoption of opportunistic networks and respective cognitive management systems in the Future Internet era,

— The design of the functional and system architecture that will address the requirements and the technical challenges,

— The development of the appropriate "Control Channels for the Cooperation of the Cognitive Management Systems" (C4MS),

— The development of the appropriate algorithms for enabling the opportunistic networks. ("Cognitive systems for Managing the Opportunistic Network"-CMON and "Cognitive management Systems for Coordinating the Infrastructure"-CSCI functionality),

— The realization of the necessary validation activities for providing evidence on the efficiency for application provision in the Future Internet era, and

— The realization of standardization activities and contribution to regulation activities.

R&D Scope

Scenarios in which efficient business and service offerings are enabled have been defined. These are cases requiring the resolution of congestion situations or the expansion of the coverage of the infrastructure, or involving localized application/service provision. More specifically, the scenarios are on:

— Expanding the coverage of the infrastructure,

— Resolving cases of congested access to the infrastructure,

— Operator-governed cost-efficient localized application, service, content provision,

— Traffic aggregation and bridging of opportunistic network with outside world, and

— Congestion handling in backhaul.

Expected Impact

Based on the expected impact from the Objective ICT-2007.1.1 "The Network of the Future" (EC Work Programme), the OneFIT project is targeting specific contributions to:

— Strengthened positioning of European industry in the field of Future Internet technologies and reinforced European leadership in mobile and wireless broadband systems optical networks cognitive network management technologies: OneFIT outcomes will shorten the time to deploy and market new services/ applications thus providing significant benefits for mobile operators and service providers. Furthermore, OneFIT will contribute to keeping the European Research into Cognitive networks at the forefront of the global research efforts,

— Increased economic efficiency of access/ transport infrastructures (cost/bit): OneFIT results are expected to have a significant impact on economic efficiency of access/ transport infrastructures (CAPEX and OPEX reduction, cost of management for customer relations),

— Global standards, interoperability and European IPRs reflecting federated and coherent roadmaps: Providing extensions to the infrastructure, the techniques expected to result from OneFIT will

support interoperability, the opportunistic networks will allow bridging between infrastructure and devices that would not have been able to access the infrastructure directly,

⎯ Wider market opportunities from new classes of applications taking advantage of convergence: Through the solutions of OneFIT, network operators and service providers are equipped to provide applications/ services in wide range of situations, and

⎯ Accelerated uptake of the next generation of network and service infrastructures: Through the OneFIT technologies operators will be given the opportunity to provide and deploy a variety of new types of services in a shorter time frame.

Involved Constituency

The consortium contains 12 carefully selected partners from 8 European countries: Finland, Poland, Serbia, Greece, Spain, France, United Kingdom, and Germany. The diverse demographics of the partners in terms of both cultural and political landscapes adds to the strength of OneFIT and assists in developing solutions that are appropriate to all of the EU member states. The international orientation of most consortium members further helps to ensure that the solutions investigated and developed by OneFIT will also be appropriate and useful in other parts of the world, allowing global application and exploitation, thus strengthening the European Economy. The consortium consists of four equipment manufacturers, one operator, one regulator, two research institutes and four leading Universities. While the universities and research centers will ensure an extremely high level of innovativeness, the business orientation, regulatory input and the orientation to real-world markets that are brought in by the industrial partners, regulator and operator will ensure that the research and anticipated innovations will be useful and exploitable in the real world. In this way the structure of the consortium will enable to produce real-world results and facilitate the rapid commercialization of the project's innovations.

4.4.7. PanLab

Overall Scope

Key Information

Runs from: June 2008 – March 2011 (34 months)

Website(s): http://www.panlab.net, http://www.fire-teagle.org, http://trac.panlab.net/trac/

Summary

Panlab provides a large scale experimental facility offering heterogeneous testbed resources to address the need of large scale testing and experimentation. The facility is composed of various testbeds forming a testbed federation among regional innovation clusters. Users of the facility can rely on a pool of federated resources to carry out testing and research & development activities. The facility is operated by

a Panlab office that acts as a broker for the participating testbeds and offers central services and tools to both partners and users of the federation. In this regard an important tool is "Teagle" which relies on a federation control framework and provides a model-based resource registry, a testbed design environment, as well as an orchestration engine that collectively allow for easy resource configuration, deployment, and management

Objectives

— Develop mechanisms and tools to describe, store, locate, and orchestrate experimental facility resources and testing services to provide composite testbeds across multiple administrative domains

— Define and implement a common abstract framework that enables the interconnection of diverse testbeds

— Integrate the concept of User Driven Innovation and execute a techno-socio-economic study to assess the long-term sustainability of the federation model

Highlights

— Design and implementation of a control framework that allows for management of highly heterogeneous resources across the boundaries of organizational domains

— Design and implementation of the Teagle framework that enables users of the federated testbeds to compose virtual testbeds consisting of diverse and distributed federated resources

— Design and implementation of domain border gateways that allows to establish dynamic overlay networks to interconnect distributed resources and separate traffic from concurrent experiments

— Cross-regional and cross-national cooperation of testbeds to leverage existing investments in experimental infrastructure

— Open Source implementation of components to enable further development by subsequent projects

— Collaboration and training activities in 5 regional innovation clusters to address the testing/experimentation needs of SMEs and academia

— International cooperation (Canada and US) to further increase the impact of Panlab results

R&D Scope

Use cases exemplify the potential of the results, and the flexibility of the solution to support very divergent future Internet testing and experimentation needs. An excerpt out of many possible and demonstrated use cases is provided below:

— End-to-end self-management in a wireless future Internet environment: This experiment aims at the improvement of QoS features (e.g., packet loss, delay, jitter) using new software for self-management over a live network environment and exploiting monitoring and configuration capabilities that different administrative domains provide.

— Adaptive admission control and resource allocation algorithms: This experiment aims at the assessment of such new algorithms and demonstrates a new federation computing interface (FCI) allowing the direct control of the used resources. Through FCI the experimental infrastructure exhibits elasticity characteristics.

— Enhanced web TV services over mobile phones: This experiment not only provides the possibility to perform test upon a video on demand platform, but it extends the environment setup to include end users in a real mobile operator context.

Additionally, the Panlab core components themselves rely on advanced internet technology:

— The Teagle repository is based in an extended version of the DEN-ng Information Model (http://www.autonomic-management.org/denng/index.php) that allows the technology agnostic description of resources and supports resource management through policies.

— In Teagle and the underlying control framework everything is treated as a service. This allows the central Teagle orchestration engine to build advanced workflows establishing distributed virtual testbeds. Such workflows can be stored and re-executed to re-build a certain testbed (e.g. to validate and compare previous results).

— The control framework foresees domain border gateways that allow establishing of dynamic overlay networks to interconnect distributed resources and separate traffic from concurrent experiments. It relies on IP-in-IP and Layer2 tunnelling (L2TP) technology and builds a full mesh between participating domains. This allows Panlab to offer a flexible facility supporting a wide range of testing and experimentation scenarios.

Expected Impact

— Improvement of the FIRE (http://cordis.europa.eu/fp7/ict/fire) facility offering

— Sustainability model for experimental infrastructure

— Improvement of testbed infrastructure efficiency (the federation as additional distribution channel)

— Impact on testbed business model (through more customers and the additional federation channel, planning security regarding investments in infrastructure is increased and investments can pay off faster)

Involved Constituency

— The Panlab Partner is provider of infrastructural resources (testbed components, e.g. hardware, software, VMs, etc.) necessary to support the testing services requested by customers. Partners interact with Panlab Office for offering their testbed(s) to customers.

— The Panlab Customer has access to specific infrastructure and functionality necessary to perform testing and experimentation. The facility resources are advertised and provided by the Panlab Office to the Panlab Customer in order to carry out R&D activities, implement and evaluate new technologies, products, or services.

— The Panlab Office realizes a brokering service for the testing facilities by coordinating i) legal and operational processes, ii) the provisioning of the infrastructures and services to be used for testing and experimentation, iii) the interconnectivity of the various Panlab Partner test-sites, and iv) the interconnectivity between the test-sites and the customers.

It is expected that the Panlab Office has been established by the end of 2010 and operates based on a commission model. A WIN-WIN-WIN (Partner, Customer, Office) model is intended. Additional seed funding/startup capital might be needed.

4.4.8. SmartSantander

Overall Scope

Key Information

Runs from: Sept. 2010 – Sept. 2013 (36 months)

Website(s): http://www.smartsantander.eu

Summary

SmartSantander proposes a unique in the world city-scale experimental research facility in support of typical applications and services for a smart city. Tangible results are expected to greatly influence definition and specification of Future Internet architecture design from viewpoints of Internet of Things and Internet of Services. This unique experimental facility will be sufficiently large, open and flexible to enable horizontal and vertical federation with other experimental facilities and stimulate the development of new applications by users of various types including experimental advanced research on IoT technologies and realistic assessment of users' acceptability tests. The facility will comprise of more than 20,000 IoT devices (sensors, nodes, etc), 12,000 of them deployed in the city of Santander and its surroundings, and the rest in the locations of Lübeck, Guildford, Belgrade, Århus, and Melbourne. SmartSantander will enable Future Internet of Things and Services become a reality.

Objectives

— An architectural reference model for open real-world Internet-of-Things experimentation facilities

— A scalable, heterogeneous and trustable large-scale real-world experimental facility

— A representative set of implemented use cases for the experimental facility, and a large set of Future Internet experiments and results.

Highlights

Successful evaluation and validation of suitable technologies for the IoT requires experimental facilities that allow open experimentation with the key enabling IoT device technologies from heterogeneous application domains at adequate scale in realistic settings, with the potential of involving real end-users in the experimentation process.

The core of the facility will be located in the city of Santander and its surroundings. The project has reserved a total budget of 1,000,000 €, of which, 500,000 € will be coming from the Regional and Local Authorities, for purchasing the IoT devices that will be deployed in Santander and surroundings. Thus, the number of devices to be deployed in Santander and its surroundings is foreseen to climb up to 12,000 devices, thus creating the basis for development of a future Smart City. Nevertheless, it is expected that the overall foreseen number of devices taking into account other locations (Lübeck, Guildford, Belgrade, Århus, and Melbourne) will reach 20,000 IoT devices.

An important number of contacts are being held with other smart-city initiatives, and the model is being shared with several stakeholders and local authorities, to promote its dissemination. Active participation and cooperation with FIREball and FIREstation Coordination Actions is being maintained both at national and European levels. During the execution of the project, SmartSantander will issue two Open Calls to fund external researchers performing selected experiments.

Sustainability and exploitation of the deployed infrastructure are both committed outcomes and are closely bound. The lifetime of the infrastructure should go longer beyond the duration of the project. This requirement will be achieved by implementing a sustainable maintenance procedure, an exploitation plan, and by allowing a flexible evolution of the facility.

The list of potential applications identified so far by the City of Santander and Cantabria Regional Government as suitable to being developed within the execution of the project is long, and only some of them will be finally deployed. Most of them offer a big environmental and social potential: public installations monitoring and management (heating, A/C, lighting, etc.), parks and gardens control (irrigation, etc), social assistance (elderly, disabled, etc.), public transportation, traffic control and parking spaces, and environmental management and monitoring (pollution, CO_2 levels, noise, etc.)

R&D Scope

The project anticipates a dialogue between cities, businesses, citizens and ICT researchers and developers using user driven innovation methodologies mediated by expert ethnographers to transform prototyped applications into a smart city collective service offering that is useful and accepted by the stakeholders on top of a common IoT infrastructure closely linked to the (Future) Internet and web. The applications and services for the smart city are to be used by real users, making the user part of the experimental research facility not only for testing applications and services, but indirectly using the infrastructure and components and most importantly involving the users in the design processes.

Existing facilities are usually not very large in scale and, more importantly, are not intended to be an open experimental research platform for the Future Internet. SmartSantander will overcome this by allowing every interested research groups to run their experiments on its truly large-scale platform.

Other of the most challenging goals of SmartSantander will be to provide means for the exposure of service assets to third parties. The diverse procedures for discovering and accessing services that are currently been proposed will be analyzed in order to include in the project the means to allow external users to experiment with accessing remotely to the facilities.

So far, no secure dynamic reprogramming mechanism exists that is suitable for heterogeneous systems, and this will be also developed within the project. Finally, deployed facility will be IPv6 aware, what is mandatory nowadays in real case settings.

Expected Impact

SmartSantander aims at optimizing the societal benefits of investing to build up such a city-scale infrastructure, so its been designed to support real life services, useful to the citizen, at the same time it copes with its primary target of providing an ambitious experimentation platform for the research community. E.g. first cycle deployment will consist of a big number of traffic sensors able to provide support for experimentation of multi-hop techniques on different topologies, and will also provide the City Council means to control the proper use of the parking slots reserved to disabled.

Besides, SmartSantander will increase European competitiveness by shortening required R&D cycles and providing faster end-user feedback for assessment of socio-economic impact for European researchers and service developers making technology more visible to the EU citizens. This is facilitated by deployment of novel IoT solutions and application pilots on a realistic target environment involving real end-users. Early exposure to the benefits of IoT technology can encourage adoption of the IoT technology and lower the boundaries of social acceptance by the public, which often acts as an inhibitor of technological advances.

The facility deployed will enable a wide range of experimentations, supporting different technology aspects and catering for different user groups (researchers, service providers, and end users).

Furthermore the project will collaborate with other FIRE projects by federating with their experimental facilities through FIRESTATION CA.

SmartSantander promotes an open model, suitable for replication, in order to ease the expansion of the deployed infrastructure by adding new distributed facilities from other cities across Europe.

Involved Constituency

The SmartSantander consortium involves the required multi-disciplinary expertise to create a European city-scale test facility that will support real life services and research experimentation at the same time. It is constituted by 15 partners from 8 European countries: Denmark, France, Germany, Greece, Italy, Serbia, Spain and United Kingdom; in addition to a partner from Australia.

Participation of the regional and local authorities is of utmost importance when targeting such a large-scale deployment. For this reason, the Santander City Council, and the Industry and Technological Development Regional Ministry (through 'Sociedad para el Desarrollo de Cantabria', an industrial promotion entity) have become members of the consortium, and demonstrated their interest on backing the proposal by making an important funds reservation as well as supporting the experimental facility deployment logistically, technically and organizationally.

The consortium consists of:

— 2 regional/local administrations:

  - Santander City Council, at a local level,

  - Sociedad para el Desarrollo de Cantabria (SODERCAN), at a regional level.

— 6 industrial partners:

  - Telefonica I+D, Alcatel-Lucent Italy, Alcatel-Lucent Spain, Ericsson.

  - 2 SMEs with strong R&D activities: Alexandra Institute, TTI Norte.

— 2 research centres: Commissariat à l'Energie Atomique, Computer Technology Institute.

— 5 universities: U. of Cantabria, U. of Surrey, U. of Lübeck, U. of Lancaster, U. of Melbourne.

Apart from researchers, citizens are also represented in the project in twofold:

— Through the City Council, that will assist in the definition of the use cases (services) to be implemented in order to validate the usefulness of the deployed facility and,

— By the Advisory Board, composed of people with visionary perspective, vast experience in accessibility and disabled people organizations, etc.

Moreover, User Driven Innovation methodologies will be applied to actively engage end users in the design process of the future services, and ethnographers will assist on the field in the definition and evaluation of use cases.

4.4.9. 4WARD

Overall Scope

Key Information

Runs from: Jan. 2008 – June 2010 (30 months)

Website(s): www.4ward-project.eu

Summary

4WARD has performed research on the architecture of a Future Internet adopting a "clean slate" research approach. This means that the practical constraints of evolving from the existing TCP/IP-based network architecture is temporarily ignored in the interest of discovering a design that is ideally adapted to present and expected future usage and is not forced to adapt to architectural decisions made some thirty years ago with quite different objectives and constraints. An architecture following this approach may be seen as a target for the current network to evolve to. It may alternatively be seen as the blueprint of a parallel architecture that could coexist and interoperate with IP, gradually expanding and taking over the functions of the old network. One migration approach is to make use of network virtualisation, where 4WARD has provided an approach in commercial setting.

Objectives

The strategic objective of 4WARD is to increase the competitiveness of the European networking industry and to improve the quality of life for European citizens by creating a family of dependable and interoperable networks providing direct and ubiquitous access to information. 4WARD's goal is to make the development of networks and networked applications faster and easier, leading to both more advanced and more affordable communication services.

Highlights

The project explored a new approach to the creation and co-existence of a multitude of networks: the best network for each task, each device, each customer, and each technology. 4WARD created a framework in which it will be easy for many networks to bloom as part of a family of interoperable networks that can co-exist and complement each other.

The 4WARD architecture incorporates embedded management, which is an inseparable part of the network and each of its components, generating extra value in terms of guaranteed performance in a cost effective way, and capable of adjusting itself to different network sizes, configurations, and external conditions under the control of policies set by the network owner.

A forwarding path is recognized as an active network component that controls itself and provides customized transport services. An active path can provide resilience and fail-over, offer mobility, simultaneously use multiple different sequences of links, secure and compress transmitted data, and optimize its performance to meet the requirements from applications.

Users are primarily interested in using services and accessing information, not in the nodes that host information or provide services. Consequently, the 4WARD architecture considers information objects (and their digital instantiations) and services as primary importance that are not tied to any particular device but can rather be mobile and distributed throughout the network. As such, 4WARD addresses one of the fundamental flaws of the Internet architecture.

The Future Internet will be even more important for society at large than the present network and 4WARD therefore also performed research on the socio-economic and regulatory issues arising from the above approaches.

R&D Scope

The project developed a set of highly advanced prototypes to evaluate the feasibility of the developed network concepts that involved integration of concepts from several different work packages. As a further result, the project developed and launched open source platforms which are available via the project's web site, which in turn supports an uptake of the results of the project, as well as fuelling new research activities.

The integration of socio-economics including regulatory issues as part of the research proved to be very valuable as we identified a number of regulatory issues that need the attention and actions of pan-European regulators and regulations. The interactions between technology and socio-economics has spurred a great interest (actually initiated by 4WARD in the BLED meeting) manifested in the FIA and has now become a stream of its own.

Expected Impact

Our research has established new networking paradigms and therefore has long-term impact for a networking based society. The results of the 4WARD project will bring a new networking experience to end-users integrating smoother, more flexible and more dependable communication into their daily life. For network and service providers, new business opportunities will be created that allow more competition by lowering the barrier to entry through network virtualisation, more customised network services and lower cost for operation and deployment of network solutions.

The project is actively participating and contributing to several fora, like the Future Internet Assembly (FIA) esp. in the Management and Service-aware Architectures, Socio-economics and Future Content Networks working groups where 4WARD participants are caretakers of the work. The project is chairing

the Future Internet cluster that is actively supporting the Future Internet Assembly but also has participation from other regions like Japan and Canada in its meetings.

Within WWRF (Wireless World Research Forum) we established the Future Internet as a permanent topic and widened the discussion beyond Europe. The project is well known to the GENI, CANARIE and AKARI communities as well as in the Chinese research community and has received requests to join from a number of organisations outside Europe. In parallel, several dissemination activities are taking place, ranging from presentation of papers in conferences to the circulation of a Newsletter, and organisation of workshops. We have had and have contacts with other regions, like US and Japan, to provide interregional collaboration.

As part of the project, a book was written, which captures and summarizes all the research results, as well as addressing also related topics such as migration. The book to be published by Springer towards the of 2010 is entitled "Architecture and Design for the Future Internet – 4WARD Project"

Involved Constituency

Ericsson, Nokia Siemens Networks, Siemens Program and System Engineering SRL Brasov - Punct de lucru Cluj, Alcatel-Lucent, NEC Europe Ltd, Deutsche Telekom AG, France Telecom, Telecom Italia S.p.A., Telekomunikacja Polska S.A., Portugal Telecom Inovação, SA Telefónica, Investigación y Desarrollo, Sociedad Anónima Unipersonal, Fundación Robotiker, Fraunhofer Gesellschaft zur Förderung der angewandten Forschung e.V., IST - Technical University of Lisbon, Kungliga Tekniska Högskolan, Lancaster University, Université Pierre et Marie Curie - Paris 6, SICS - Swedish Institute of Computer Science AB, Universitatea Tehnica din Cluj-Napoca, Technion - Israel Institute of Technology, Technische Universität Berlin, University of Surrey, Universität Basel, Universität Bremen, Karlsruhe Institute of Technology, Universität Paderborn, Waterford Institute of Technology, Valtion Teknillinen Tutkimuskeskus, Rutgers University (USA), Instituto de Telecommunicacões

4.4.10. TRILOGY

Overall Scope

Key Information

Runs from: Jan. 2008 – March 2011 (39 months)

Website(s): www.trilogy-project.org

Summary

Trilogy focused on the key control functions of the Internet, in particular Reachability and Resource Control. The project's results include architecture, protocols, simulations, prototypes and standardisation at the IETF. Our bold objective was to re-architect the world's ICT infrastructure. We believe we have

succeeded: in particular by developing two new, important control functions that will be deployed widely on the future Internet and will significantly improve it. These are Multipath TCP and CONEX. Economic thinking has been central to our work and has strongly influenced our protocols. They have also been influenced by real measurements that we performed on the Net. We have also successfully invested a lot of effort on standardising our work at the IETF. We believe that these factors greatly increase the chances that our work will see real deployment and so change the world. Already some parts are in use and industry outside Trilogy is working on implementations.

Objectives

— Re-design the Future Internet Architecture

— Drive developments towards a multipath Internet including research and implementation

— Create standards and implementations from research results and therefore prepare the road for real-world adoption

Highlights

We have invented two new protocols, Multipath TCP (MPTCP) and Congestion Exposure (CONEX), that we believe will significantly improve the Internet for its users – making it more resilient, more flexible and more cost effective. Our work includes theory, adoption studies, simulations, code, standardisation and experiments.

We have created an open-source implementation of MPTCP in Linux, which has been extensively tested by others and been ported to Android, and Oracle has begun its implementation in Solaris.

We initiated and lead two new Working Groups at the IETF, which standardise MPTCP and CONEX for the Internet. We believe that this is the first time that an EC collaborative research project has a created a new IETF working group to standardise its results. We have documented our approach to bringing research results to the IETF, so that other European researchers will hopefully be able to use these guidelines to follow our success.

We have worked on several other Internet technologies. We investigated, analyzed, implemented and evaluated deployable extensions to the Border Gateway Protocol to introduce inter-domain multipath routing. Some of our measurement studies have shed light on important properties of today's Internet that were unknown (such as the router-level topology of the Internet or the degree and nature of deployed middleboxes). We have created open-source implementation of LISP (locator/identifier separation protocol) in FreeBSD. Project members were lead participants on other technologies that help the transition to IPv6 and mitigate denial of service attacks. The latter is under evaluation by the Broadband Forum, whilst the former can already be bought as a product (e.g. NAT64 and DNS64 are implemented by Cisco, Juniper and Microsoft) or is available as open source products that people outside the project have created (e.g. in Bind).

Overall at the IETF we have authored or co-authored 10 RFCs, with another 12 "working group drafts" (which are RFCs 'in the pipeline'). An RFC is a formally agreed IETF document, either an Internet standard or advice on a particular topic. An RFC exists forever and so forms a perpetual public deliverable from the project. We believe that this is substantially more RFCs than has been achieved by any previous EC project.

An innovative aspect of the project was to include economics and public policy experts within the consortium. We also organised two international workshops with invited industry leaders, including CxOs, whose businesses revolve around the Internet. Their input helped guide our work from commercial, regulatory and Net Neutrality perspectives.

We have disseminated our research results very widely in top conferences and journals such as SIGCOMM, IMC and NSDI (Best Paper Award). Overall we have published 75 papers in journals, conferences, workshops and book chapters. We initiated a new workshop series, ReArch, as part of the prestigious ACM CoNEXT conference, and organised several other academic workshops.

Finally, we would like to point out that Trilogy was a small Integrated Project, with only 20 Full Time Equivalents, so we believe it has had outstanding 'bang per euro'!.

R&D Scope

It is easy to invent a new Internet protocol; it is extremely difficult to design one that is actually deployed and used. We have taken several steps to increase the chances that our output is in the second camp. We have identified particular scenarios for initial deployment, where the developed protocols can make a big difference to imminent problems and without global deployment. For example, a data centre operator using multipath TCP – we have tested it on Amazon's EC2 Cloud with great results as published in SIGCOMM. Secondly we have done extensive measurements of the behaviour of firewalls and other middleboxes, and designed our protocols to avoid being blocked by them. Further, our designs have been influenced by thinking about the economic impact of their potential uses – the Internet is as much a forum for economic tussles as a technology for connecting computers. Finally, we have been very open to collaboration with others – people are more interested when they are involved. All this has led to considerable interest already from outside the project in Trilogy-developed technology. For a small research project, this is significant success.

Expected Impact

Multipath TCP (MPTCP) enables a TCP connection to be spread over multiple paths. Benefits include better resilience (the connection works even if one path fails), improved network utilisation (resource pooling) and a form of mobility. It could be used by consumer end devices (so you can use two wireless connections

or two ISPs simultaneously), by multihomed Internet servers (to improve their resilience and throughput to end users) and within data centres (to decrease response times to "searches").

Congestion exposure (CONEX) enables all IP devices along the path to have full visibility of the total level of end-to-end congestion, information that is currently only available at the endpoints. Benefits include better traffic management by the network (because they can now better understand the impact of each user on the network) and end-to-end quality of service under the control of the end user (whereas today the operator uses techniques like Deep Packet Inspection (DPI) to guess which applications are more important).

The project has worked on one of the key technologies that helps the transition from IPv4 to IPv6. Called NAT64/DNS64, it allows the connection of IPv6 clients to IPv4 servers and has already made its way into the market. Also we have worked on "SAVI", which is a mechanism to prevent spoofing of source addresses - a Denial of Service attack of growing importance.

Involved Constituency

The consortium was well balanced with five industrial partners and five academic partners from a diverse set of countries: BT (Coordinator), Deutsche Telekom, NEC, Nokia, Roke Manor Research, Athens University of Economics and Business, Universidad Carlos III de Madrid, University College London, Université catholique de Louvain and Stanford University.

The project however was very successful in involving a much larger group of people. At the IETF we have worked extensively with industry experts from outside the project. Two IETF Technical Plenaries discussed "Network Neutrality and the IETF" and "Economic perspectives on Congestion"; Trilogy contributed keynote speakers and the moderators. We ran a week-long Summer School for PhD students; the lectures and slides are available on-line. We organised several research workshops, including two Dagstuhl Perspectives workshops, and at several academic conferences, as well as our ReArch series. We organised "Internet Reloaded" and a GIIC workshop with business leaders, to gather external commercial input that helped guide our work.

4.4.11. WEBINOS

Overall Scope

Key Information

Runs from: Sept. 2010 – Aug. 2013 (18 months)

Website(s): www.webinos.org

Summary

webinos envisions web applications running and utilizing resources across a range of connected devices, interacting seamlessly with each other to contribute to the development of the internet and facilitate users with more attractive, innovative and valuable applications.

To fulfil its vision, webinos will define and deliver an Open Source Platform which will extend existing Web technologies to enable Web applications and services to be used and shared consistently and securely over a broad spectrum of connected devices, including mobile, PC, home media (TV) and in-car units. This platform will be built upon and move the required open standards forward.

This platform will have a concrete implementation that is accessible to all as an open source asset.

Objectives

— Deliver an open source platform based on web technologies that is capable of using and sharing applications consistently and securely over a broad spectrum of converged, connected devices - in the mobile, home media (TV), PC and automotive domains,

— Define and build, technology proven, key enablers where such are not available, yet needed for the platform. Build upon some the existing technologies that can describe, negotiate and adapt applications for local device context. Further, it will extend these technologies so they not only deal with device context but other facets, such as user location, network properties, social network and consumer preferences. All of these must be proven to facilitate the efficient and cost effective deployment of applications to converged devices.

— Define and build a web based application security framework that addresses user and service provider needs, underlying platform and device requirements and delivery and management aspects, which has been technically proven and is easily deployable.

Highlights

webinos supports the following key concepts:

— webinos builds on the achievements of the Web community and extends an open source web runtime environment.

— webinos symbolizes a leap forward: it is a federated web runtime that offers a common set of APIs to allow apps easy access to cross-user, cross-service, cross-device functionality, in an open yet secure manner.

— webinos aims to support easy programming of applications by offering a single virtual device that can consist of all devices owned by a user. This virtual device inherently represents the changing circumstances of context and devices.

— webinos will create open specifications and open source reference implementations that not only show the feasibility of specifications but also simplifies the adaptation by the industry.

— webinos will allow discovery of devices and services not only based on technical, but also on contextual information, such as social proximity. The use of social proximity will also be used to help users find adequate privacy preferences by aligning them with decisions made by trusted friends.

R&D Scope

To achieve the goal of providing an open, secure, distributed and cross-domain platform for the easy deployment of web applications, webinos introduces the following three primary innovations:

Personal Zones

Devices are registered in Personal Zones, which act as Overlay Networks and abstract from the

underlying physical networks and protocols. The Personal Zone provides simple access to local and remote services, simplifying the task of an application programmer, allows simple discovery of devices and services, provides adaptation based on access context and supply communication paths based on trust relationships, decoupled from underlying technologies.

Personal Zone Proxy

A webinos Personal Zone Proxy acts as stand-in for Messaging, Discovery and Security functions when a device has no Internet connectivity. It stores information (events, messages) and synchronises with a central hub once connectivity is re-established, thus reducing the 'housekeeping' requirements of application developers. Additionally, the Personal Zone Proxy acts as the policy enforcement point for the access to device APIs and is responsible for local discovery and connectivity to non-IP based devices, such as Bluetooth, ZigBee, NFC and locally connected devices.

Security Framework

As a secure web platform, webinos started with security concepts developed for the WAC platform and extended them for use in a distributed environment. The most significant feature is the security policy architecture, which primarily controls applications' access to device features, but also states rules about inter-device communication and event handling. The policy architecture also controls the storage and use of context data and is the main way in which user privacy can be protected. Policies are written in XACML and enforced at the Policy Enforcement Point, a key component in the personal zone proxy and personal zone hub. Policies are synchronised between user devices either via the personal zone hub or peer-to-peer, an important capability when two devices communicate for the first time and need to share credentials.

Expected Impact

Platform for ubiquitous, high value service deployment. By focussing on user centric security and addressing, head on, the paradox of how to enhance the ubiquitous web with rich context but preserve consumer data privacy, webinos will hit the sweet spot that will enable a rich value add service to be deployed over many device types, whilst retaining user empowerment.

Development of a converged application platform that will give content provides both greater reach (market) and reduce development costs.

More competitive economic landscape: a free open source platform, based upon royalty free technologies, that has flexible commercialisation routes will benefit many players from small SMEs to large service providers down to the small application developers

Involved Constituency

The webinos project is driven by a strong consortium built from mobile phone manufacturers, telecommunication operators, car industries, and top-notch research facilities.

In addition to this core group, webinos welcomes (and has already acquired) associated partners.

External companies have been invited and present as previous project meetings. The upcoming codefest is also open to participation of interested external parties.

In the longer term, webinos is planning to create a legal entity separate from the EU project to allow the management of the Open Source assets beyond the timeframe of the project. A significant part of this is to attract a wider range of partner companies, allow easy participation of non-EU companies and handle contributions and influence over the webinos platform based on a merit principle, which is widely accepted in Open Source circles as the fairest and most open way of governance.

Furthermore, webinos will not only provide a web platform, but also a development system and reach out the application developer community and actively support and encourage the use of webinos for web application development.

4.4.12. *Zonerider*

Overall Scope

Key Information

Runs from: Jan. 2011 – Oct. 2011 (9 months)

Website(s): www.zonerider.com

Summary

Zonerider wants ordinary businesses and individuals to open their broadband connection, and earn free income as a result. Our patent pending platform recruits ordinary people to become Stakeholders in the broadband and increasingly knowledge economies of today and the future. The platform is new, but not necessary newly formed, and constitutes a paradigm shift in thought on how future internet connectivity can be provisioned, by forming an arbitrary tool to deliver better and more efficient means of connectivity. At its heart is a dead simple control mechanism that controls and monetizes data flow and shifts access costs from end user to media and advertising depending on market sentiment at any particular time or place. This goes against the established order and can bypass expensive incumbent gateways; thus fuelling innovative community broadband initiatives on a local and global scale.

Objectives

— Unlock value in existing infrastructure, offer secure access guest utility, and offer nomadic fat pipe usability

— Allow content/media to generate better returns in an increasingly difficult monetizing environment

— Involve communities worldwide to benefit financially while increasing broadband proliferation

Highlights

The Zonerider system is essentially a hotspot delivered mode of access, where end users casually connect to a network and are redirected to a landing/signup page to obtain access. Zoneriders core platform is driven by its patent pending windows application. Once installed on an ordinary PC the connected wireless router or LAN is instantly converted into a hotspot with no configuration changes to the router/network or adjustments to its controls required (we encourage the network name to be changed to something more commercial for marketing presence alone) This is a unique and innovative system with simplicity at its foundation, and offers anyone with no networking or high level internet skills to become part of the Zonerider community. The Community itself is dependent on an equal number of fixed line subscribers, thereby working hand in hand with Telecom and ISP incumbents, hence our use of the term arbitration. We will also employ smart bandwidth monitoring and predictive solutions for bandwidth optimization, and packet prioritization, and are working on a Cached Distribution Node (CDN) to add better performance on the networks edge.

R&D Scope

Zonerider is currently deployed in Latin America Eastern Europe, USA and Western Europe. The infrastructure itself is existing and not new, but the potential to unlock value is new and unforeseen. The current product offering is through ordinary subscription, limiting its market potential to developed

regions. Our project will dramatically change the landscape as we move rapidly towards sponsored access; opening opportunity for less developed markets.

Expected Impact

Broadband high speed access is often linked to prosperity and is increasingly appearing on government agendas and taskforces worldwide. High speed broadband is quantified and compared to every day utilities such as electricity and water, and has been hailed a basic human right by leading welfare organisations. Instant communication has been long championed as a key to creating transparency and creating equal opportunities in information deprived regions. Without proper communications infrastructure these regions with fall further behind as western economies enjoy capacious bandwidth to support more complex applications and rich media. It's a case of "must have" over "nice to have". Zonerider empowers and enriches communities to embrace the digital age, and become part of the larger worldwide internet community.

Involved Constituency

From inception Zonerider has geared its product to work in a high level partnership capacity and we have attracted interest on both a commercial and government level in the US, UK, and a few Eastern European states, respectively. We have recently been awarded a fast track UK government grant and are collaborating with companies based in Cambridge and Bath. Working with communities and government run initiatives is a natural for us, and we intend to be at the forefront of future developments in this area. We believe winning this award would raise our profile and awareness toward these organisations types.

4.5. France

4.5.1. SEANET

Overall Scope

Key Information

Runs from: Jan. 2011 – Jan. 2014 (36 months)

Website(s): *in production*

Summary

SEANET project consists in developing ad hoc communication networks dedicated for high data rate ship-to-ship exchanges.

One of the main targets being to provide high data rate Internet to the ships while being on the open sea, different means enabling to interconnect these ad hoc networks to the rest of the world, such as satellite and ship-to shore communications, are considered in addition.

Such a network has to withstand the mobility of the nodes by using mechanisms of dynamic connectivity reconfiguration. Basic range and data rate requirements (30 Nautical Miles, 10Mbps) require the use of relaying functions and smart directional antennas.

Objectives

— Provide high data rate interconnection between ships

— Provide or improve Internet access to ships on the open sea

— Improve safety and support to rescue platforms in case of accidents over seas and oceans

Highlights

A SEANET ad hoc network is based on a dynamic tree-based architecture, in other words a stack of Point-to-MultiPoint clusters which can be reconfigured automatically depending on the plaftforms movements, the incoming or outgoing ships, the density of these ships. The related algorithms have already been tested in a previous program, called RAF, with vehicles in public safety application.

The difficulty in this project is to deal with the expected range. For that purpose, the antenna gains having to be maximum and compatible with a 360° coverage, smart antennas of the FESA (Fast Electronically Steerable Antenna) type have been chosen for both transmission and reception sides. These multi-beams antennas, either in a cylindrical form-factor for a full 360° coverage or in 3 panels covering each 120°, are able to switch from one beam to another one in less than 200ns.

For the case the radio with the FESA antennas has a system gain insufficient for the connection between one source ship and one distant ship, a multi-hops relaying technique comes in additional help. The dynamic tree-based algorithms contain basically this feature.

FESA antenna is able to deal with azimuth coverage, however the movements of the platform have to be compensated by additional means. This is the role of the mechanical stabilizer in charge of pitch and roll attitudes.

Moreover, frequency spectrum, even on the sea, has to be preserved and spectrum efficiency of this type of network is improved through spatial frequency « re-use ». The criteria allowing to decide or not the re-use of a frequency channel are studied within this project..

R&D Scope

SEANET developments include important researches for mobile networks to maintain continuous web connexion. Wireless connexions involve Point to Multi-Points links potentially offering different routes from a single source to the same remote destination.

Mobile Ad-hoc Routing algorithms will then have to be investigated to ensure that information follows the best possible route depending on its QoS level. This type of algorithm in addition to actual Internet services will be an added value for provided services quality and system robustness.

Apart from those items, SEANET system will be fully IP compatible, include standardized QoS protocols, and data encryption to protect users privacy.

Expected Impact

Open sea is still a widely unexplored area for Internet deployments common people with no access to very expensive communication solutions as satellite receiver.

SEANET possible impact is to get rid of this limitation by offering an extended coverage to areas within shore line of sight, and for open sea to drastically enlarge connexion capacities around local spots receiving connexion from Satellite (offshore station, fleets mother ships…).

For public users, the final result to obtain from SEANET outputs is that travels by ferries lines, inter connexion from island to island, and also simple sailing will be able to provide the same comfort as day to day life and connection to the world.

For fishing, transport, or offshore industry, large fleets will also be able to stay connected with their linked premises on the ground, and therefore be able to communicate using mails, VoIP or videos.

Finally all people leaving the ground to sail all over for more or less important duration will be able to keep accurate information about weather evolution, which can be a matter of life and death..

Involved Constituency

SEANET is a collaborative project supported by "Pôle System@tic" and "Pôle mer Bretagne", and uniting different French university and industrial partners as described below:

University:

— ENIB (Ecole Nationale des Ingénieurs de Brest)#

— Telecom Bretagne

Industry:

— Technopôle Brest Iroise

— ESTAR

— DETI

— SATIMO

— THALES Communications

The project tasks management is shared between the different entities depending on their core activities. THALES Communications FRANCE, as project leader, makes the interface between SEANET consortium and OSEO which is delegated by the founding entities to follow the project evolutions.

4.5.2. THD Platform

Overall Scope

Key Information

Runs from: May 2004 – April 2011 (30 months)

Website(s): www.portailthd.fr

Summary

The THD experimental platform is an open platform for digital content and services businesses in the Ile-de-France region (around Paris). This is a cooperative project piloted by the competitiveness cluster Cap Digital which brings together many public and private partners. The THD platform seeks to accelerate the prototyping and industrialization of online innovative services. It comes into play for the final stage of R&D, the technological adjustment of the interface or the ergonomics of the service, via experimentation in real utilization conditions with optical fiber users.

More than thirty companies are already using the THD platform via 28 experimental digital services and content projects in domains such as e-learning, video games, serious games, 3D, HD video, videophones, search engines, IPTV, web 2.0…

Objectives

— To accelerate the prototyping and industrialization of innovative online services on very high bandwidth networks via full-scale experiments, and the evaluation of services with beta testers;

— To capitalize on the observations on uses in very high bandwidth experiments, in a perspective of setting up an observatory of digital services, contents and practices in the Paris-Ile-de-France region.

Highlights

The project aims currently at offering the best development environment to companies and especially SMEs of the media & learning industries that want to test innovative services.

Thus, the platform includes a test-bed, methodological and technical assistance, hosting, assistance in the field of secured payment, cofunding, a portal to access the experimental projects, a unique FTTH optical-fibre and cable subscribers panel (2 300 households), beta testing end-users, focus groups, HSBB Workshop at the Cité des sciences and at the Centre Pompidou, workshop with end-users…

The project benefits from its attachment to the cluster Cap Digital in terms of cross-fertilization between domains. Companies from the video game, movie, digital cities, e-learning, and culture industries are thereby working side by side and may take advantage of one another experimentations. Besides, 78 % of the companies has established relations that could lead to industrial or commercial partnership, thanks to the platform project.

Eventually, as part of the observatory of digital services, a survey on green datacenter technical requirements is monitored.

THD platform is actually planning to widen the range of the services to professional ones, and to other domains addressed by the cluster, such as e-health.

R&D Scope

THD Platform addresses mainly innovative usages and services that will be made possible by the FFTH development. Thus, it keeps up with breaking through technologies, such as:

— IPV6, through the international watch;

— low latency networks, through online video games and virtual consoles experimentations;

— content aware networks, through experimentations on voluminous files express transfer systems, that allow the receiver to use the content before the sender has finished to send it on the network;

— collaborative content creation, through experimental projects on collaborative annotation of movies for instance;

— new media, through projects on new forms of TV participative programmes, based on virtual reality and connected TV.

The "Living Labs" European label granted by the European Network of Living Labs (ENoLL) was awarded in November 2008 to the THD Platform for the Greater Paris Region Living Lab, the "uses laboratory" of the Cap Digital competitiveness cluster of which it is a stakeholder.

In 2010 the THD platform was the winner of the Innovation Awards of the FTTH Council Europe in the "Business & Services Innovations" category.

Expected Impact

The user panel is spread across the Ile de France Region. So as to be more representative, and anticipate the switch to very high speed equipments, it not only includes FFTH subscribers but also ADSL and cable subscribers. Many services deal with asymmetric exchanges between different connexion equipments.

Moreover, projects on e-learning and visio conferences that are currently experimented on THD platform, or future projects on e-health, with always a focus on the user experience, aim clearly at reducing the Digital Divide and encourages e-inclusion.

Involved Constituency

THD platform is a successful example of collaborative project. It gathers many partners that work closely together:

— 9 public funders

— 1 cluster in the Ile de France region : Cap Digital, which focuses on digital content and services. This cluster is the operator of the Platform.

— 2 associations, one of which is Silicon Sentier, which focuses on internet and cyber culture. It offers visibility and encourages cross fertilization between its hundred of members

— 5 academics, mainly focusing on the panel, the datacenter and the test-bed

— about 30 SMEs, mostly leading experimental projects on the platform

— 2 big companies, Sony and Orange

— 2 cultural institutions: the Cité des Sciences and the Centre Pompidou, which host demonstrations of the platform experimental services

— 2,300 households that experiment the services and give feedbacks

4.6. Finland

4.6.1. ICT Shok

Overall Scope

Key Information

Website: http://www.futureinternet.fi/

Summary

The programme addresses short, medium and long term issues of the Internet infrastructure, which are essential both for Finnish industry as well as for Finnish society to be ready for recovery from the economic crisis.

The Programme is part of TIVIT – the Strategic Centre for Science, Technology and Innovation in the Field of ICT (= "ICT SHOK"). Tivit was founded by a group made up of forty different firms, universities or public bodies. The centre coordinates an annual investment of approximately forty million euros in research and in development of ecosystems based on ICT technology.

Other running TIVIT programmes are 'Flexible Services' (FS), 'Device and Interoperability Ecosystems' (DIEM) and 'Cooperative Traffic' (CT). In addition currently there are two programmes under preparation: 'Next Media' (NM) and 'Open and Web'd Software' (SW). Together these programmes cover the whole area of "Future Internet". Recent descriptions of the programmes can be found here.

R&D Scope

Scope of FI programme and other TIVIT programmes is indicated below by the FP7-ICT research areas:

Network Architecture
FI: Overall developments in network architecture (a cross issue), routing scalability, L2/L3 routing, energy efficient end-to-end connectivity, reliable transport protocols, delay tolerant communications. Active contribution to IRTF and IETF.

Service Architecture
FS: a modular service infrastructure and related ICT-enablers, service functionalities and tools which leverage the growth in service business.

Future Content Networks
FI: Information networking incl. Architecture, Naming, Implementation, Performance, Security; P2P, P4P, FP7 PSIRP.

The planned NM programme: The research is divided into six generic themes. The themes arranged along the axis "technology – user – business" are media access, production tools, personalisation, social interaction, media use and business models & concepts. Every theme consists of range of topics with their own specific research questions.

Internet of "Things"

DIEM: Opening embedded data in various devices to applications to create local services in millions of places.

Trust, Security, Privacy, Identity

FI: An essential cornerstone of the FI programme implemented as a cross-issue in 1st phase. In 2nd phase there will be a dedicated Security work package focusing on anomaly detection, unwanted traffic, and trust and reputation.

Future Internet Research and Experimentation

FI: Development of network testbed providing L1…L3 connectivity for FI programme and other TIVIT programmes, based on the infrastructure of the Finnish University network (FUNET).

…can be considered as examples to facilitate the description of the scope of initiatives (or activities), at the discretion of the Member State representative.

Expected Impact

The ultimate aim of the work undertaken at Tivit is to increase the speed at which know-how in the ICT sector progresses and at which innovations and the results of research are adopted by the business community. This aim remains central to Tivit's work and the active guidance of industry, the fact that Tivit remains focused and Tivit's creation of international breakthroughs in important areas on the very cutting edge of our sector all ensure that Tivit never loses sight of its goals.

FI: The ICT SHOK FI programme combines 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. The programme actively interacts with the international standardization bodies, such as the IETF, and research activities in EU and US aiming to make impact on world-wide Future Internet research and development process. For the consortium keeping up the ability to lead the development in the Future Internet will be essential for the future business.

Involved Constituency

FI: The partners of the FI consortium represent key Finnish players in the Finnish telecom and datacom industry both from service provider and vendor side as well as key research institutes on the area: Ericsson, Nokia, Nokia Siemens Networks, TeliaSonera, F-Secure, Stonesoft, Cybercube, CSC, HIIT,

Tampere University of Technology, TKK, University of Helsinki, University of Jyväskylä, University of Turku, VTT.

4.6.2. RAIIC

Overall Scope

Key Information

Runs from: April 2009 – Feb. 2012 (34 months)

Website(s): www.futureinternet.fi

Summary

Currently, obtaining reliable, contractually guaranteed WAN connectivity increases connectivity price by orders of magnitude. This project focuses on a concept called Redundant Array of Inexpensive Internet Connections (RAIIC) which aims to provide a more economical alternative that would have equivalent capabilities to existing reliability solutions. The concept is based on the idea that unguaranteed access still works adequately for most purposes – if we could bundle several of these cheap links seamlessly together, traditional High Availability approaches could be implemented with fraction of a cost. Existing economical alternatives, such as multi-homing using routing protocols, suffer from long recovery times during outages. The project addresses and studies the background and issues in current operating environment, implements a possible technical approach, and includes studying of the economical impact of RAIIC if deployed.

Objectives

— Study the economic feasibility of RAIIC model

— Demonstrate technical feasibility of RAIIC model with chosen technology approach

— Promote awareness via standardization

Highlights

Multipath or multihoming are not new concepts; neither is virtual private networking over Internet. However, combining all of these together to provide a service that appears to end-users just like a traditional High Availability WAN connection can be considered a highlight. Project has demonstrated that not only it is technically and economically achieveable, the performance even with our prototyping-grade implementation is very good. Key piece of potential, Mobile IP-based implementation approach is on track to become an IETF standard.

R&D Scope

Immediately deployable in present-day Internet without changes required to existing applications; all the logic and functionality is constrained to specific infrastructure nodes.

Expected Impact

Potential to act as a market enabler; the RAIIC approach would most likely complement existing offerings by providing a moderately priced reliability approach between traditional high availability network accesses and totally unguaranteed, basic WAN connectivity. The business case for a Virtual Service Provider (VSP) operating without any physical infrastructure has been presented and analysed and appears feasible.

Multipath studies could help in balancing network congestion by implementing multipathing within network infrastructure instead of changing end-hosts (legacy compatibility). The research could have additional use cases in cloud computing by economically ensuring quality of connectivity between data centers.

Involved Constituency

The project has been implemented as part of the national Future Internet program (www.futureinternet.fi) of TIVIT (Finnish Strategic Centre for Science, Technology and Innovation in the field of ICT) combining the efforts of industry and academia to develop Internet technologies. The program has been supported by Tekes – the Finnish Funding Agency for Technology and Innovation.

4.6.3. TIVIT Programmes

Overall Scope

Tivit (Strategic Center for Science, Technology and Innovation in the field of ICT) Programs

Tivit was founded 2008 by a group made up of forty six different firms, universities or public bodies. The centre coordinates an annual investment of approximately fifty million euros in research and in development of ecosystems based on ICT technology. The Tivit coordinated programs address several short, medium and long term issues of the Internet infrastructure, which are essential both for Finnish industry and helps in the recovery of the economic crisis.

Currently running Tivit programmes are 'Future Internet' (FI), 'Device and Interoperability Ecosystems' (DIEM), 'Cooperative Traffic' (CT), 'Next Media' (NM), and 'Cloud Software' (CSW). Together these programmes cover basically the whole area of European "Future Internet"-PPP. Descriptions of the programmes can be found at www.tivit.fi

R&D Scope

The programs aim at pre-competitive industrial research domain with a strong emphasis on business creation.

The scopes are shortly describes by the visions and missions of programs:

Future Internet:

Vision: Future Internet = a mission critical backbone of global information society

Mission: Enhance the Internet technology and ecology as a platform for innovation while providing strong governance over the use of the network resources and information

Devices and Interoperability Ecosystem:

Vision: Physical space will be interactive and intelligent

Mission: Open embedded data in various devices to applications to create local services in millions of places.

Co-operative Traffic:

Vision: Traffic 2.0: Future traffic can be seen as a web of cooperative traffic services, where devices, vehicles and infrastructures are context aware and capable of providing the needed information seamlessly and on time.

Mission: To create new global ICT based business ecosystem for cooperative traffic

Cloud SW:

Vision: By 2015 the Finnish software industry will substantially increase the value of its software assets due to it's world-class capability and know-how to efficiently and competitively develop, deliver and use software competencies with a focus on defining, building and utilizing software assets and new ecosystems that have the largest sustainable value add for the global business.

Mission: Value adding by cloud software, defining and implementing open cloud solution, lean transformation of SW-companies

Next Media:

Vision: Next Media vision is that by 2020 Finnish media industry has become Ahti of the global Media Ocean by achieving breakthroughs in business models, concepts and technology and by penetrating into new business areas

Mission: Implement a radical renewal of media business value chain in Finland

The ultimate aim of the work undertaken at Tivit is to increase the speed at which know-how in the ICT sector progresses and at which innovations and the results of research are adopted by the business community. This aim remains central to Tivit's work and the active guidance of industry, the fact that Tivit remains focused and Tivit's creation of international breakthroughs in important areas on the very cutting edge of our sector all ensure that Tivit never loses sight of its goals.

Expected Impact

The contributions will come through the novel business ecosystems created in the programs. No direct strategy exists for addressing some specific societal impacts.

Involved Constituency

The partners of Tivit proram consortia represent key Finnish players in the Finnish telecom and datacom industry both from service provider and vendor side as well as key research institutes on the area. Currently, there are over 100 organizations participating in the programs. Each program is lead by a driving company (like NSN, IBM, Nokia). Funding is coming from Tekes, Academy of Finland and EU-programs.

4.7. Germany

4.7.1. G-Lab

Overall Scope

Key Information

Full name: Deepening G-Lab for Cross-Layer Composition

Runs from: Oct. 2008 – Aug. 2012 (47 months)

Website(s): http://www.german-lab.de

Summary

The G-Lab project aims at the development of future Internet technologies which overcome the challenges posed by new Internet applications with high demands on the Internet infrastructure. For that purpose, it relies on both experimentation and theoretical research work in a complementary manner.

The G-Lab consists of a Germany-wide research and experimental facility used to investigate the interplay between new technologies and the requirements of emerging applications. The BMBF funded project consists of 32 partners. The first phase started in October 2008 with six partners and runs for three years. The second phase started in September 2009 and consists of nine additional research projects. The G-Lab

experimental facility is composed of wired and wireless hardware with over 170 wired nodes which are fully controllable by the G-Lab partners.

Objectives

— Combination of future Internet studies and experimentation

— Investigation of clean slate and evolutionary approaches

— Foster experimentally driven Internet research

Highlights

The G-Lab project has created several implementations of research software as well as close-to-the market tools. The main representative of the former category is the Topology Management Tool (ToMaTo). It allows researchers to create their own network topology without having to care about the underlying physical installation. To the latter category belong the HAMCast project and the media processing software of Alcatel-Lucent that both target at improved multimedia delivery to the user. For the evaluation of the user perceived service quality, a strong cross-domain interworking with psychologists is employed. In order to not neglect environmentally friendly network operation, an extra project is funded within G-Lab looking at energy-efficient communication and network management.

Further highlights are the large contributions to standardization efforts. This comprises in particular the activities of Nokia-Siemens Networks, Alcatel-Lucent, Qualcomm, HAW Hamburg, FU Berlin, and NTT DOCOMO on the standardization within 3GPP, IETF, IRTF, ONF.

Another highlight of the G-Lab project is the alignment with other future Internet initiatives such as FI-WARE, VIRNE, SAIL, and OFELIA. This is achieved through the fact that most institutions of the GLab project also participate in the aforementioned initiatives.

Awards and selected publications:

— Leibniz-Award for Anja Feldmann

— Paper in JSAC "FIRMS: a Future InteRnet Mapping System" by Michael Menth, Matthias Hartmann, and Michael Hoefling

— Paper at CoNEXT 09 "Improving Internet-wide routing protocols convergence with MRPC timers" by Anthony Lambert, Marc-Olivier Buob, and Steve Uhlig

— KuVS Communication Software Award of the German Community of Information Technology for Barbara Staehle, Florian Wamser, Matthias Hirth, David Stezenbach, Sebastian Deschner, and Dirk Staehle

Links:

— ToMaTo: http://tomato.german-lab.de/

— HAMCast: http://www.realmv6.org/hamcast.html

R&D Scope

Advanced Internet technologies within the G-Lab project are in particular IPv6, OpenFlow, and virtualization as well as cloud mechanisms. Firstly, a fully IPv6 compatible integrated sensor network is implemented within the experimental facility by the project Real-World G-Lab. In addition, the HAMCast project develops multicast solutions that seamlessly include IPv6. Secondly, the facility has OpenFlow capable devices. Within the project, the integration of such OpenFlow devices into the ToMaTo tool was developed. As a consequence, our platform facilitates network agnostic experimentation studies in OpenFlow environments. Thirdly, the G-Lab experimental facility is enabled with features of a private cloud. Besides serving as building block for ToMaTo, this allows for direct research on cloud computing, e.g., on security of virtual machines.

Expected Impact

The G-Lab project is expected to impact the current as well as the future Internet by the implementation of ready-to-the-market products for multimedia service delivery and by basic research towards the development of an improved Internet architecture. Therefore, the project is mainly technology-driven. However, the technical innovations are expected to impact also social challenges such as the Digital Divide. For example, wireless mesh networks can be used for Internet access in rural areas. Those networks are under investigation in the work package "Wireless networks and mobility" and the sub-project "Real-world G-Lab".

The scientific impact manifests itself in already over 100 publications in journals or at conferences. In addition, a considerable number of IPRs have been generated. G-Lab has also a large impact on other future Internet initiatives through cooperation. For example, the interworking of the ToMaTo tool with GENI and the Future Internet Forum in Korea are under way. The short-term impact of G-Lab relates in particular to standardization efforts within the IETF, the IRTF, and the 3GPP. Furthermore, the media processing techniques of Alcatel-Lucent and the virtualization mechanisms of Nokia-Siemens Networks and NTT DOCOMO will impact the development of current and future products of the respective SMEs such as infosim.

Involved Constituency

The project G-Lab consists of 32 partners in total coming from academia, research institutes (e.g. Fraunhofer), vendors (e.g. Nokia Siemens Networks), an operator (NTT DOCOMO), an Internet Exchange Point (BCIX), and SMEs (e.g. LamdaNet). It is funded by the federal ministry of education and research (BMBF) and the project execution organization is the German Aerospace Center (DLR).

There is a strong cooperation between G-Lab and Panlab, Onelab, GENI, PlanetLab, and the Future Internet Forum (FIF) in Korea in the form of joint workshops and exchange of students and software.

The following academic, industrial, and SME partners are involved in G-Lab:

Academic

Fachhochschule Lübeck, Fraunhofer FOKUS, Freie Universität Berlin, Hochschule für Angewandte Wissenschaften Hamburg, Technische Universität Ilmenau, Technische Universität Carolo-Wilhelmina zu Braunschweig, Universität Bremen, Universität Duisburg Essen, Leibniz Universität Hannover, Universität Lübeck, Universität Passau, Universität Stuttgart, Julius-Maximilians-Universität Würzburg, Technische Universität Kaiserslautern, Technische Universität Berlin, Technische Universität Darmstadt, Technische Universität München, Karlsruher Institut für Technologie (KIT)

Industrial

Nokia Siemens Networks, Alcatel-Lucent, Qualcomm, NTT DOCOMO, Oracle (Sun microsystems), Cisco

SMEs

akt infosys, coalesenses, BCIX, infosim, LambdaNet, link-lab, Tixel, the unbelievable machine company.

4.7.2. G-Lab Deep

Overall Scope

Key Information

Full name: Deepening G-Lab for Cross-Layer Composition

Runs from: Sept. 2009 – Feb. 2012 (30 months)

Website(s): http://www.g-lab-deep.de/

Summary

G-Lab DEEP explores innovative composition-approaches for cooperation between network and application level services with the focus on security in the Future Internet. The main focus of the research is the secure exposure, interaction and composition of future network capabilities with services from the web, telecommunication and business process world. This Future Internet approach builds upon a cooperative network and service monitoring security approach to detect, prevent and mitigate network and service level attacks. G-Lab DEEP utilizes a federation approach to make resources from heterogeneous testbeds, networks and domains available within the cross-layer, cross-domain composition approach. The German Future Internet testbed platform G-Lab is used and extended for the evaluation of the developed concepts.

Objectives

— Secure Network & Service Level on demand composition based on requirements of application

— Securing the Future Internet through cooperative Network and Service Level Monitoring and Attack Mitigation

— Wide-Scale Federation of heterogeneous resources from different testbeds, networks, domains

Highlights

Large-scale experimental platforms offer a strategic tool for shortening innovation cycles and fostering cooperation between academia and industry. G-Lab DEEP exploits the German Future Internet testbed for developing network-service integration technologies with strong focus on security in the Future Internet. Industry strength compositional approaches as promoted by SOA (Service Oriented Architecture) are extended into the network layer to achieve the flexibility needed for in-depth network-service cooperation and large-scale interworking over heterogeneous federated network environments. The project puts emphasis on early demonstration of innovative technologies.

In a future Internet a broad variety of applications will exist that are built and composed upon services of different domains (sensors, telecommunication, television, business and public processes, web services, social networks). These applications require different characteristics of the network infrastructure in terms of security, energy awareness, real-time support, interaction, privacy, timeliness, QoS, QoE. Looking into approaches like functional composition, network virtualization, evolved packet core, in a Future Internet Architecture these requirements will be met by different services, protocols and enablers that are offered by and within the network in different domains.

Therefore the same questions and problems arise in both the application layer and the network itself such as, for example, problems related to the description, location and functional composition of service units. SOA concepts are relevant to all levels. Yet approaches upon the network require extended flexibility in the network protocol stack or in a clean slate network approach. There is already a great deal of flexibility in the applications field, and as a result a new compositional approach that incorporates the network functionalities as services are easier to implement. This project will attempt to bring both worlds closer together and to produce and set up suitable cross layer, cross technology and cross domain results.

Whereas in evolutionary approaches the integration of security has yet failed to be addresses in the network design, the project targets security mechanisms that are included within in the network and based on cooperative network and service level monitoring to prevent, detect and mitigate attacks. These security mechanisms extend across all layers for decision making and network control as well as for examining suitable management and implementation mechanisms.

Refining the current G-Lab experimental platform is also an essential aspect of this project and will help to ensure the position of future experimental research as part of the overall G-Lab framework. The project targets especially prototype implementations for the example of multimedia application.

The main focus of the research is to convey the requirements that result from a complex service request to a concrete application layer and network layer workflow.

R&D Scope

Innovative Key FI Technologies:

— Cross-layer based solution for network and service interaction

— Dynamic resource allocation and task delegation for security and service specific demands

— Development of functional blocks for security on network and service layer

— Network and Service Functional Composition

— Service Brokering - Composition and Exposure of FI functionalities to third party developers over standardized interfaces

— Extension of G-Lab platform by development of new Boot Images

— Federation concepts for cross testbed experiments on national and international scale

— Cooperative Network and Service Level Monitoring

Expected Impact

The cross-layer cooperation between network and service functions provides application-awareness in the network and network-awareness on the service level. Applications and end users can influence and decide about network functions and the network gets access to service level information. This enables a completely new flexibility in future networks. This can be used to set up application-specific function chains (network virtualization) customized to application demands. The involvement of application layer functions at end systems push nowadays "neutral" networks towards non-neutral but fair customized networks.

The project puts emphasis on early demonstration of innovative technologies. The project participates workshops for dissemination and provisioning of hands-on experience of project results to local industry.

Involved Constituency

The G-Lab DEEP project is one of 9 phase 2 projects of the German Lab project funded by the German federal ministry of education and research. G-Lab DEEP cooperates with partners from the phase 1 project and phase 2 projects (FoG, Netlets) that explore innovative network flexible network architectures. Within the Federation goals the projects aims at a collaboration with other European and world-wide testbeds like Planetlab. The project consortium consists of 3 universities and 1 applied research institute, namely:

Fraunhofer FOKUS, the chair of Architektur der Vermittlungsknoten by Prof. Dr. Thomas Magedanz at Technical University Berlin, the chair of Computer Networking Technology by Prof. Dr. Erwin Rathgeb at

University Duisburg Essen and the chair of Integrated Communication Systems by Prof. Dr. Paul Müller at Technical University Kaiserslautern. The combination between academic institutions and Fraunhofer ensures innovative research combined with a focus on industrial demands. The G-Lab DEEP project leader Dr. Tanja Zseby as well as Prof. Dr. Paul Müller are also members of the G-Lab advisory board.

4.7.3. G-Lab_Ener-G

Overall Scope

Key Information

Runs from: Sept. 2009 – Sept. 2011 (24 months)

Website(s): http://www.net.fim.uni-passau.de/ener-g

Summary

The mission of G-Lab_Ener-G is to develop a comprehensive approach to the future Internet architecture that includes energy efficiency as a fundamental principle. Key enablers for reaching this goal are the virtualization and consolidation of communicational and computational resources and the exploitation of energy-saving features of hardware. Specifically, the project addresses all successive layers in the protocol stack by providing energy saving mechanisms to the layers above on each respective layer. In addition to the initial aim of achieving a more energy-efficient operation of the G-Lab research testbed, the project has evolved and is now on route to demonstrate an architecture that optimizes energy efficiency through virtualization without violating quality of service constraints. The envisioned architecture allows the easy setup of virtual routers to form virtual networks that fulfil an application-tailored quality of service (QoS) while minimizing the required energy resources.

Objectives

— Achieve a more sustainable operation of future infrastructures by creating virtual overlay networks and mapping them energy-efficiently on the underlying physical hardware

— Provide application-tailored virtual networks with demand-driven quality of service

— Create a working prototype running on the G-Lab testbed to show the real-life applicability of the approach

Highlights

G-Lab_Ener-G aims to create a future Internet architecture by its unique integrative approach of cross-domain experience. The project features innovative technologies from the fields of virtualization, energy-efficiency and quality of service. In detail, the final implementation will feature the automatic creation of virtual networks supporting QoS which will be transparently mapped to the underlying physical infrastructure. Additionally, by involving partners from industry and regional medium enterprises,

applicability in real life scenarios can be guaranteed and the impact of energy reduction can be evaluated both in terms of cost and environmental impact. A working prototype of this new future Internet architecture will be demonstrated early 2011 and later be made available to all G-Lab partners across Germany, and will thus function as a highly flexible platform for developing services in next generation networks.

R&D Scope

In contrast to other approaches to increase energy efficiency, this project's comprehensive concept considers all layers, from the physical up to the application layer. As a result, all optimization is coordinated in an integrated approach: On the physical layer, energy-related parameters of hardware are monitored and energy-saving features are put to use. New communication protocols are designed that support the application of these features by enabling availability without assuming permanent accessibility. On the application layer, virtualization allows managing resources in an energy-efficient, transparent and flexible way. An inherently energy-efficient network infrastructure can only be realized by making these strategies interact.

Expected Impact

The results gained during the course of this project will be a major step towards understanding and modelling the complex interdependencies of service quality, energy-efficiency and virtualization. Network virtualization allows the development of universally applicable concepts for provisioning energy-efficient communication services fulfilling a certain QoS without depending on the underlying physical network infrastructure. Furthermore, the working prototype will function as proof-of-concept for realizing a network infrastructure based on rightsizing of provisioned resources in contrast to the current reality of best effort service and over-provisioning of resources. Realizing this paradigm shift will create a true future network, capable to deliver an application specific performance while minimizing the environmental impact on network side.

Involved Constituency

G-Lab_Ener-G involves partners from academia, industry as well as a SME. It is funded by the German Ministry of Science and Education. While the partners from industry (Cisco Systems and Sun Microsystems) provide mainly inside know-how in their respective area of expertise, the academic partners focus on research questions. The local SME :a:k:t: Informationssysteme AG runs a datacenter and offers experience especially regarding system monitoring and virtualization.

4.7.4. IKT2020

Overall Scope

R&D program "Information and Communication Technologies 2020 (IKT 2020)".

General objective of IKT 2020 is to consolidate and expand technological leadership in the ICT sector. Furthermore, the competitive ability of Germany as a place for research, production and employment is to be secured and enhanced by ICT both for specific branches and across different branches. The intention is to address all the links in the innovation chain. IKT 2020 focuses on applications in the branches automotive, mechanical engineering, health, logistics and energy/environment. Basic technologies under consideration are electronics, microsystem technologies, software technologies and communication and network technologies. Within this program, several initiatives contribute to future internet, among which the most important are:

— Transport technologies for future internet (100GET)

— Studies and experimental platform for the internet of the future (G-Lab, Germany-Lab)

— Enablers for ambient systems and services (EASY C)

— New internet-based services

— Internet of things

R&D Scope

Transport technologies for future internet (100GET)
Driven by companies and research institutes from Finland, France, Germany, Spain and Sweden, a common strategic research and development initiative "100GET" (100Gbit/s Carrier-Grade Ethernet Transport Technologies) was launched. The initiative is intended to coordinate the research efforts in the different European countries to fit the steadily growing demand for higher data rates and increasing overall data transfer in the internet. The target is to develop a 100 Gbit/s Ethernet for transport networks comprising aggregation and backbone networks. This technology will adapt the new packet transport functionalities to the European safety and security requirements for the internet and other applications, assure Europe's good starting position in Ethernet aggregation and strengthen the market position of European industry by potential gains in packet-switched core and end-to-end networking. The aim is to have the novel technology to become a new standard and thus a dominating technology. In particular, the technological aims are:

— Development of high bit rate technologies, components and methods suitable for 100 Gbit/s transmission

— Selection of the most advantageous system technologies that can be implemented in existing networks

— Examination of innovative network architectures, network control and network management technologies

The new technologies are implemented in a testbed facility.

Studies and experimental platform for the internet of the future (G-Lab, Germany-Lab)

New services and applications in the internet for example in the health sector, for new business processes or care for handicapped people require a level of security, reliability and quality of service of the networks, which is not realized today. The Internet's shortcomings will not be resolved by the conventional incremental and 'backward-compatible' style of academic and industrial networking research. To cope with the growing demands, new architectures and protocols have to be developed and have to be tested on an experimental platform.

G-Lab is a framework for studies on mechanisms, protocols and basic technologies for the internet of the future and at the same time an experimental platform to test and evaluate new concepts in an environment close to reality. In the G-Lab project, two different ways to develop the Internet are under investigation: The „Clean Slate"-approach and an evolutionary development approach. The aims of G-Lab are:

— Support of high mobility in wireless networks;

— Service orientation on all layers of the network;

— Integration of „existing old services" as for example telephony;

— Integration of services with real-time requirements;

— Expandability to new network technologies like sensor networks;

— Consideration of interaction in systems with highly heterogenous resources and diverse physical access and transport;

— High level of security and reliability.

Research topics involve new concepts for routing and addressing, new network-structures with new concepts for vertical and horizontal allocation of functions, support of mobility and wireless access, cross-layer network control, monitoring and managing, support of quality of service, resilience and security, service architectures and service composition and economical aspects of transition to post-IP.

Enablers for ambient systems and services (EASY C)

Research for a future standard for cellular radio „beyond LTE" was started in the project EASY C to comply with the growing demand for higher data rates, the need for real-time applications, fairness within the radio cell and other aspects of quality of service. To meet these challenges, new technologies for increasing spectral efficiency, reducing latency and improving fairness especially at the edges of a cell have to be developed. In the framework of EASY C, these new technologies are developed, investigated in testbeds close to reality and contributions to standardisation are elaborated.

The approach of the German nationally funded EASY-C project is to use multi-cell- cooperation techniques. It is well known in research community and industry that these techniques are the key to significantly higher spectral efficiencies. The aim is to increase the spectral efficiency compared to UMTS cellular networks by a factor of 6. Research activities in EASY C include advanced single- und multi-user MIMO, network MIMO, interference coordination, cooperative relaying and self-organizing networks. New algorithms and hardware architectures are developed and implemented in the testbeds in Dresden and Berlin.

New internet-based services

New internet-based services offer potential for growth and employment. Thus, one initiative within IKT 2020 was dedicated to research on new services in the internet. The potential of new services can only be exploited, if enterprises in the respective branches of application can easily and intuitively compose the new service out of flexible modules. To achieve this, platforms for composition of new services are needed. Further, new services should take into account mobile applications, aspects like seamless services and context sensitivity. The funding concentrates on two fields of application, namely health services (home care, patient care, prevention/wellness) and new internet-based business processes.

The scope of research includes:

— Service platforms and middleware for heterogenous networks (data management, easy access, reliability, privacy, security, identity management);

— Mobility and interoperability everytime (adaption to different devices and to context, seamless communication, quality of service);

— Service-centric, self-organising networks (localisation, social and semantic network- technologies, service overlays, peer-to-peer technologies, mediation-overlays for convergency of application and transport layer);

— Tools for fast and intuitive development of new applications (user-based services, easy composition and orchestration of services)

Within the initiative, five cooperative projects were started in 2008 / 2009.

Internet of Things

The Internet of Things Initiative addresses three levels of developments:

— Product Instances: In an industry-led consortium, the implications of a semantic product memory are explored spanning RFID technology to a future smart label technology. Main issues are the context-sensitive composition and semantic aggregation of data from single instances of products from their RFID / smart label memory and additional Internet sources, the access and use of data as well as the necessary interfaces infrastructure.

- Product classes: Management of data from products equipped with RFID tags and future smart labels technology through their whole life cycle, the management of data from these product classes from the perspectives of producers, vendors, and customers.

- Process management: Tools for composing and managing complex business processes that are driven by data from in large volume from products equipped with RFID and future smart label technology, including automatic data aggregation, exception handling and adaptive learning of process behaviour.

Tools and technology are developed relating to demands from the application perspective. Additional projects are under preparation.

Expected Impact

Transport technologies for future internet (100GET)

- Technological basis to comply with the demand for growing data transfer rates in the internet;

- Improving the security of the network against attacks. The network management and architecture of the envisaged 100 GET technology will lead to a more resilient network;

- Contribution to standardisation of 100 Gbit/s Ethernet;

- In case of success of the project, Ethernet will become the widely-used standard for LAN, metro and core-networks;

- Strengthening European network suppliers in worldwide competition

Studies and experimental platform for the internet of the future (G-Lab, Germany-Lab)

Within G-Lab, new concepts for a future internet are developed and tested on an experimental facility. G-Lab is the German contribution to the ongoing international activities for a new internet (FIRE, GENI, Planet-Lab etc.) and is linked to other international activities.

The basic concepts in G-Lab together with other international activities may on the long term replace the present patchwork-internet structure and provide security, resilience, new applications, best support of mobility and scaling up to trillions of users in the internet of things.

Enablers for ambient systems and services (EASY C)

- Contribution to the standard beyond LTE, especially in the field of cooperative cells and advanced MIMO;

- Strengthening the leading role of European suppliers in cellular radio technology and their subsidiaries in Germany;

- As radio frequency is a scarce resource, it should be used most efficiently. EASY C will increase the spectral efficiency in cellular radio;

— EASY C will provide higher data rates in cellular radio, thus cope with the demand for broadband technologies in cellular radio;

— EASY C will be an enabler for new applications in mobile communication by increasing quality of service. Especially, features like latency in the network and fairness within the cell will be improved.

New internet-based services

— New services and tools for service development in the health sector will be implemented;

— Easily to compose services and by this way fast implementation of new services, especially for SME´s, thus strengthening the role of SME´s in internet-based services.

Internet of Things

The fundamental transformation of business processes from a top-down-perspective, as typically realised by a process planning approach, into a bottom-up- or a mixed perspective for a strongly event-driven process model through:

— integration of tools for RFID technology and its technological successors in production, logistics, services and retail, independent of specific technology

— the effective management of large volume data caused by the integration of vast numbers of single product items and semi-finished goods into a coherent data management model in various business management systems, and the processes necessary for the communication of these data between different business management systems for different uses.

— the efficient and automated management of business processes triggered and driven through events generated by RFID (and successor technologies) –equipped product items.

Involve Constituency

Transport technologies for future internet (100GET)
From Germany, the following partners are involved:

— Network suppliers, including four system providers and five component providers;

— One network operator;

— Two companies working in simulation and network planning;

— Research institutes, among which are ten universities, one Fraunhofer-institute and two other research institutes.

Studies and experimental platform for the internet of the future (G-Lab, Germany-Lab)
Involved are:

⎯ Six universities;

In a second phase of G-Lab, further partners including companies will participate in the initiative.

Enablers for ambient systems and services (EASY C)

Involved are:

⎯ Two network operators;

⎯ Ten companies representing network system suppliers and component suppliers and hardware and software suppliers for terminals;

⎯ The German regulatory authority in telecommunication (Bundesnetzagentur für Elektrizität, Gas, Telekommunikation, Post und Eisenbahnen);

⎯ Research institutes, among which are two universities and one Fraunhofer-institute.

New internet-based services

In four cooperative projects are involved:

⎯ Twelve SME´s

⎯ Six large companies

⎯ Six universities

⎯ And seven research institutes like Fraunhofer-institutes and others.

Internet of Things

Involved are:

⎯ Software development: the three largest software companies in Germany, several special-purpose-developers, as well as six SME's in software development,

⎯ Application areas: the two largest German logistics companies, two large retail companies, as well as five large companies from other application areas, such as automation, pharmaceutics and automotive.

⎯ Science: five universities, five Fraunhofer institutes and DFKI.

4.8. Hungary

4.8.1. BudapestAR

Overall Scope

Key Information

Runs from: Jan. 2011 – Jan. 2012 (12 months)

Website(s): www.budapestar.hu

Summary

Online industry trends have been emphasizing consumers demand on virtual communities throughout the last years (eg. Facebook, Second Life). Our mission is to build a real community in the real world with the help of smartphones' technological toolkit. The BudapestAR project is a service that uses smartphone capabilities on highest levels. Consumers get on demand information according to their location, needs and social relations in real time on the go via their everyday widgets.

The technology behind this solution is based on the new technological wave called Augmented Reality that help to embed virtual communities to our everyday life. Featuring the newest technological solutions it has never been easier to reach high volume of consumers with certain information while providing them satisfaction.

Objectives

— to connect the point of interests to the costumers in an entertaining way

— to be a driver of the tourism in an environmental friendly way

— to give a perceived utility of the device for smartphone holders

Highlights

The value in our project is to help people to find easily and fast places and to get into touch with these locations. The key innovation in our project is in one hand the technological breakthrough and on the other hand the creative business model. The technology innovation is to combine augmented reality solutions with platform independency empowered by social networks.

The involvement of local small businesses is a key element of our project, but we also thought about the big national institutions like the city zoo and nature parks (e.g. tour routes, etc.) which can bring these institutions competitiveness.

The fact that our project is based on network connection means (at least) two important features: global implementation and local solutions for foreigners.

Our business model can be three sided.

— Freemium: the usage of the application is free but in time we want to give payed premium solutions for customers.

— Broker model: the services can pay a monthly fee or on transaction basis.

— Advertisement model: the classic model is also can be a good solution to the revenue model.

The long run plan is mainly focused to provide not just a local service but a platform which can later on transferred to multiple locations to create an international network.

R&D Scope

Using the latest online technologies, featuring HTML5 and W3C geolocation API we would like to create a standard tool which can be used on the majority of modern communication devices, including smartphones and the soon to be very popular tablet PCs. In order to reach the critical mass of users we are about to integrate our services with the major social media platforms and community services which can also be used as a driving force to promote our events and offers.

Using our application users will be able to seamlessly navigate in realty using their smartphones. Their current location and direction (GPS and compass) will be linked with the view through the phone's camera and available locations and actions will be displayed on the LCD in a desired manner.

According to the phone sales numbers our application will can be used on the big majority of new devices and numerous currently sold handsets (iphones, Android phones and Windows Phone 7 systems as well).

Expected Impact

The impact of our project is on one hand the fast and easy orientation of our users and on the other hand a very useful and efficient method to display businesses. Using our creative solutions (in application video, voice, enhanced communication to users) our future partners can appear as innovative businesses which will provide them competitive advantage among others.

With the project we want to support important but underfunded entities as well, for example national parks, public hospitals and services, etc.

Involved Constituency

A successful city wide project has to have partnerships with local authorities to appear cities historic buildings, theatres, museums, etc. and to support tourism with our application. With the augmented technology we can show the city's historical sites and buildings in the same way as they were there 50 or 100 years ago. With the application users can compare the past and the present or even the future.

Significant cityscape plans can also appear in the application, so the folks can have real impressions about the operations.

The project is going to be established in Budapest, Hungary. For this, we would like to use the city's name to get closer to partners and users. We want to make an application which makes the life in a big city easier and freer. I assume the product can stir up the stagnant water and make some real competition in the local market.

4.8.2. Creative Selector

Overall Scope

Key Information

Runs from: Sept. 2010 – Dec. 2011 (15 months)

Website(s): www.creativeselector.hu

Summary

Creative Selector supports the formation of new businesses that use advanced web, mobile and social networks. It allows individuals to share business ideas with other innovators to support the formation of the final business concept and in the promotion to build trust and community.

Objectives

— To support the formation of businesses that use the web, mobile and social media networks

— To provide an "idea" crowdsourcing platform to share information among partners

— To build an active and creative community willing and able to think on new business trends

Highlights

Since its launch in the beginning of September, Creative Selector had over 11 thousand individual visitors, more than 3000 registered users, and 128 project ideas that were submitted and actively discussed. Our users are all over from Hungary and also form the Hungarian speaking communities of the neighbouring countries, mainly from Romania and Slovakia, but have significant number of users from Austria and Germany also. The ideas submitted are all have some uniqueness and they are all planed to be built on the most innovative technologies available. Our mentors that evaluate the ideas submitted are form the most prominent business professionals (NOKIA, HP, IBM head of portfolio, Microsoft product development manager, etc.).

R&D Scope

Creative Selector is using state of the art internet technologies for its own website, database and server solutions, it uses the most popular social media networks. All the ideas that are uploaded to Creative Selectors's website are to involve state of the art technologies.

Expected Impact

Sharing information with partners at the early life cycle of a business builds support and trust for your idea. By sharing the initial idea you not only create a better offer, but also avoid costly mistakes. With the launch of Creative Selector crowdsourcing website we expect to grow a community that helps to create better business models and to go to market faster and with less money. The trust gives your brand energy, strength, and flexibility that can help you well into the future. Both openness and trust enhance your ability to add and adapt future offerings that keep your products and services fresh, along with your brand.

Involved Constituency

Creative Selector has currently 2 funding industrial partners: T-mobile and HTC. It also cooperates with local initiatives similar to ours, like the TEDxBUDAPEST, the TECH MEETUP, and have good connection with influential bloggers and the alternative press.

4.8.3. eBook Reader

Overall Scope

Key Information

Runs from: Dec. 2010 – June 2011 (7 months)

Website(s): http://100konyv.alexandra.hu/ie9/index.html

Summary

One of the key motivations was to find the potential of HTML5 related technologies by identifying and many times exceeding the limits of future web standards. We wanted to build the world's first eBook reader experience based on the promise of HTML5 as the application platform and it's best in class implementation using Internet Explorer 9 and Windows Azure as the backend. In order to achieve the broadest consumer reach we partnered with Alexandra Ltd., Hungary's largest book retailer to find a very visible source of content with huge online distribution channel (400K registered users, 50K unique visitors per day). The team involved not only developers but a user experience specialist and even a sound

engineer who composed atmospheric sound structures to amplify the feeling of immersive reading. The result is a cutting edge showcase of the platform capabilities.

Objectives

⎯ New, realistic reading experience on the web with ergonomic design and ambient music.

⎯ Discover the potential of the new HTML5 standard.

⎯ Unified reading experience across platforms (PC, laptop, slate, mobile).

Highlights

The new browsing and reading experience is created using technologies in the new HTML 5 standard including: canvas, audio, svg, font embedding and cloud platform: Windows Azure.

The prototype for Internet Explorer 9 is created working closely with Microsoft Hungary and Alexandra Ltd.

This project adds to the industry effort that steers people from conventional paper-based reading toward e-books and digital reading devices resulting in a more environment friendly experience.

Pilot implementation with a hundred classics is available here (Hungarian language, Internet Explorer 9): http://100konyv.alexandra.hu/ie9/index.html

Giving a broader and more environment friendly access to books should be a major goal in the industry.

R&D Scope

HTML 5 (canvas, audio tag, svg, typography).

Cloud computing: books are hosted on Windows Azure blobstore.

No plugin required!

Expected Impact

This project adds to the industry effort that steers people from conventional paper-based reading toward e-books and digital reading devices resulting in a more environment friendly experience.

This site should raise attention to the strength of HTML5 in the consumer world.

Involved Constituency

This project is a result of a collaboration of Microsoft Hungary, Alexandra Ltd. and Budapest University of Technology and Economics, Department of Automation and Applied Informatics.

The prototype is created for Internet Explorer 9 and is published through websites: www.alexandra.hu, www.awebszepsege.hu

4.8.4. *fullXS*

Overall Scope

Key Information

Runs from: Feb. 2008 – Feb. 2011 (36 months)

Website(s): adi.fullxs.com

Summary

The project aims to develop a content delivery platform for mobile devices optimized for live and recorded video content, including live user generated content (UGC) from mobile devices.

fullXS is an open platform, which enables anyone with basic online experience to create a mobile content service and deploy it to various mobile platforms. This eliminates the barrier for content owners and generators to mobilize their assets and easily monetize from it with no need for software development and infrastructure building.

The platform leverages all advanced mobile phone features (sensors, GPS etc) and is complete with advertising and payment solutions and advanced recommendation engine. This gives complete flexibility for the content provider-to-be to create specific business models and content services with the highest impact.

Objectives

— The objective is not only to minimize, but completely eliminate the barrier for content owners and generators to mobilize their assets and easily monetize from it. No software development and infrastructure is needed. Complete content service can be configured online including payment and ad solutions.

— enable small and medium content creators and owners to build realistic business models to reach the "long tail" of mobile content consumers with niche interests.

— create advanced recommendation feature using collaborative filtering is used to ensure that the appropriate content (including UGC) reaches interested consumers.

Highlights

We have launched a live traffic information service for mobile phones as a limited pilot with a local traffic camera operator in Budapest. The pilot includes 90 traffic cameras in 28 major intersections and around 1000 test users.

There is a pilot implementation of an ICT accessibility solution for the deaf and heard of hearing based on our system. A square close to the Parliament in Budapest was made accessible using our solution.

Involvement and contacts with industry:

Home/office security companies can provide new service by transmitting surveillance camera feeds and other sensor data to the owners' mobile devices. We are currently working with an industry partner to integrate our system with their service platform. There is also interest from local mobile operators.

Excellence in themed areas and/or cross-domain:

This is the first fully open platform to create complex mobile content service. It enables content providers from a multitude of different domains to create a service. Experience gained from these domains continuously contribute to the enhancement of our system.

R&D Scope

Novel streaming technologies: the system utilizes the latest HTTP live streaming that leverages existing web server infrastructure (cache-able) and firewall friendly, adaptive to bandwidth, and can be used via wifi access points.

Cloud computing: Due to high load and variability of load server components take advantage of the cloud computing concept.

Innovative user interface: intuitive user interface is designed to enhance user experience taking advantage of touch UI features.

Sensor access: all sensors available in mobile phones (accelerometer, compass, GPS etc) are made accessible for the content provider to enable the flexible configuration of context dependent content provision.

Advanced recommendation engine: the recommendation engine takes advantage of novel feature detection algorithms enhanced by collaborative filtering.

Expected Impact

Our system was designed with universal usability in mind. It is an open platform, anyone with basic online experience can open an account and create a mobile video content service.

The project was designed to encourage content owners to experiment by minimising the risk, mobilize hitherto untapped content sources to create new business models and enable small/medium size niche content providers to reach specific groups of consumers.

Example for small content owner becoming a mobile service provider:

A local chef is now able to monetize on his existing assets by entering the mobile market. A video based recipe book is being created to distribute several hundreds of recipes to mobile users. The bottleneck is no longer system development but content creation itself.

Accessibility:

The platform enables ICT accessibility solutions for the deaf and hard of hearing by context dependent play-out of sign language videos to the mobile phone referring to various indoor and outdoor POIs (point-of-interest). Being an open platform, as a community accessibility solution, members (local entities, citizens, groups supporting the deaf) can contribute by defining new POIs and adding accessible videos. This results in a constantly evolving accessibility solution with ever increasing coverage and functionality.

Involved Constituency

Research and development leading to fullXS platform has been carried out by the Mobile Video Consortium. The members include the Inter-university Center Telecommunication and Informatics consisting of the Technical University of Budapest, Lorandt Eotvos University of Sciences, large multinational companies and Hungarian High-Tech SMEs. The project was co founded by the Hungarian National Office for Research and Technology.

4.8.5. *Grandparents-Grandchildren Competition of Informatics*

Overall Scope

Key Information

Runs from: May 2003 – ongoing (regularly organised event)

Website(s): http://www.inforum.org.hu/unoka-nagyszulo-versenyek/2009/

Summary

The main idea of the project is to close the digital gap between generations using family bonds. It is generally known that most of the people above 50 are digital illiterate and excluded from the information society. Grandparents-Grandchildren Competition of Informatics as an inter-generational project aims at raising awareness of all family members and the whole society to involve the older generation into the information society.

Grandparents-Grandchildren Competition of Informatics events encourage grandparents and their grandchildren to compete as a pair with other grandparents-grandchildren pairs in filling out a test using an internet search engine as a support. The competition followed by huge media attention therefore it has strong multiplication effect in countrywide.

Objectives

— Reduces digital gap between generations

— Supports seniors' digital literacy or computer skills

— Increases seniors' level of living standard by involving them into the information society

Highlights

The project aims to call attention to the importance of seniors' involvement into the information society. The idea is that grandchildren who are bond to be digital natives should help or motivate their grannies to use computers and information and communication technologies. The innovation in this project is not the technology but the inter-generational solution that encourages using technology which is available for everyone.

Most of the companies in the field of information and communication technology are our supporters for our target group is their potential costumers.

As an innovation of the project running 7 years ago, an online semi final Competition preceded the regular one. By placing it online, people from remote areas and physically handicapped people could participate as well.

Competitors usually come from many different parts of the country or even ethnic Hungarians from the neighbouring countries.

R&D Scope

If we are able to organise the competition in every year, it gives opportunity for seniors to learn about the latest technologies.

Expected Impact

Grandparent-Grandchild Competition of Informatics has been organised 9 times so far in different points of the country. Today it is not only a family program anymore, it has become a foundation stone of the starting of a social movement as the competitions have mobilised 1 350 families so far. The question of the quality of life and the use of computers of the elderly have come into the spotlight due – to a not negligible extent – to this competition, as the competitions were widely followed with attention by the media.

Quite huge number of participants applied but only 120 couples (grandparents and grandchildren) could take part in each event. The increasing number of applicants showed us that the project is popular.

A large number of enterprises supported the competition providing gift for winners. The enterprises found our initiative important which indicates that other stakeholders of the information society agree that such a motivation program is needed.

Involved Constituency

The events of the project are usually supported by the National Authority. Small and bigger enterprises support the events by giving the winners' prizes (electronic devices). Cultural and educational institutions help us in recruiting potential competitors.

4.8.6. iGlue

Overall Scope

Key Information

Runs from: Nov. 2010 – ongoing (ongoing)

Website(s): www.iglue.com

Summary

iGlue is the revolution of meaning. It not only helps us understand information on the Internet better but it will also make the Net understand us and adapt to us.

iGlue, an integrated online content manager and search engine that goes beyond today's widespread, language-dependant search mechanisms based on identifying character strings. iGlue identifies and manages entities, not keywords. Whether he is called Alejandro Magno, Büyük İskender or Lissandru lu Granni, these names all refer to the same person: Alexander the Great, and most likely we would like to find information about the person himself. This is the principle iGlue uses to manage entities appearing in web content, and it will find relevant information even if the given element appears in a form that is different from what we used in launching the search.

Objectives

— Annotate words on any webpage via an automated machine process and via user involvement

— Build world's largest semantic database to supply value added content to annotated initities

— Wikify the web

Highlights

Hyperdata

The most common model for connecting data on the web has been hyperlinking, which takes you not to the content element but to the web page that contains it. A hyperlink is one-directional, it points to one

location and only works with net addresses. As an improvement on the hyperlink, iGlue has developed the hyperdata model. In this system, elements of syntactic value are linked with each other and any element of a web page, whether it is a word, image or a piece of data, can become an information-rich junction

Some of the main features of the hyperdata model include:

⎯ locally displayed information about the entity

⎯ identifying entities instead of character strings

⎯ directly pointing to entities instead of IP addresses

⎯ context sensitivity – working with network-based applications, such as map viewers, calendars, media players

⎯ a relation system trackable in either direction

⎯ option to choose several destinations from one junction

⎯ no need for built-in linking, the application is capable of mapping the entity's relational structure according to customized preferences

⎯ entity-level relevance, handling of homonyms and synonyms, i.e., the application is able to recognize whether the word "smith" is a proper name or an occupation

R&D Scope

iGlue takes advantage of all of the latest Internet developments and elevates them to the next level. The program's ability to machine annotate any website text and assign to that text semantically linked information from the world's largest massively organized semantic database is unprecedented.

Expected Impact

The heart of the iGlue application is a collaboratively developed, flexibly structured database that contains semantic elements, entities and their relational connections. We believe that the collaboration of motivated, enthusiastic people can create a new, network-based intellectual depository of the information age which may take us to the next level of knowledge management.

⎯ collaborative editing help EU members work on same database

⎯ free usage and accessibility to all members

⎯ open architecture to cooperate with other systems

⎯ multi-lingual text handling

Involved Constituency

iGlue is a private Hungarian company funded by Power of the Dream Ventures and private Hungarian investor. The company also collaborates with other web companies and has good relations with Governmental agencies operating in the library and archival field. But the programs main user base is the international community.

4.8.7. Integrated Programme to support FI research

Overall Scope

Integrated programme for supporting Future Internet research in Hungary.

General goals are:

⸻ Concentration of the financial and human resources

⸻ Focusing the R&D activities on the fields related to Future Internet

⸻ Coherent and integrated projects

⸻ Long term financing of the activities

⸻ EU and international cooperation in Future Internet research and experimentation

The objective of the program is to coordinate and strengthen the Future Internet related research activity in Hungary and to ensure the required financial support and the critical manpower that is necessary to have a successful program.

Participation in the Future Internet research programs is vital for Hungary to keep steps with the European and worldwide research activities. Based on the earlier research results and international co-operations it is anticipated that Hungarian researchers could successfully participate in the Future Internet initiatives of the 7th Framework Programme. Furthermore it is an important goal to include industrial partners in the program. The concept of the initiative is similar to the ongoing US and EU programs taking into account the Hungarian capabilities and strengths.

R&D Scope

The following summary shows the priority areas covered by the Hungarian initiative within the main areas of Future Internet research.

Network Architecture

The initiative has four activities related to network architecture. The 'Complex Networks' activity is related to self-organizing ICT networks and networking principles and pushes forward theoretical and applied research on new network structures. 'Mathematics of Internet' is dealing with new optimal

network topologies and traffic management principles. 'Socio-Economic Research' is predicting trends in user demand and its impact on new technologies and network structure. 'New Protocols' is developing new Internet architecture that supports the vision of availability everywhere and anywhere (applicability of cross-layer design, evolutionary architectures). Information flows, network management issues and how new services can be provided in these new architectures. New transmission/information sharing/coding paradigms (e.g. network coding, fountain codes) and new transport protocols for next generation networks including wireless and mobile networks. Intelligent networks.

Service Architecture

The initiative will concentrate on web services and service oriented architectures in network measurements and monitoring. Data from the measurement infrastructure of the Hungarian testbed will be collected in large databases (Virtual Observatories) and will be made accessible via web services to the monitoring efforts and also for later analysis.

Future Content Networks

The '3D Internet' part of the initiative will support the establishment of 3D Internet test laboratories where software and hardware development for 3D graphics, visualisation and communication devices will be supported. New scientific and commercial applications will be developed including areas of media distribution and virtual presence. These new applications place new types of traffic demands and constraints on network architectures, which will be investigated within the FI testbed of the initiative.

Internet of "Things"

The 'Internet of Things' part of the initiative will cover logistic systems based on RFID and 'Intelligent home' in favour of reducing energy consumption. RFID assisted detection of hazardous and polluting waste, protection against medicine counterfeiting, registration of breed animals. It will also contribute to e-Government, the IPv4-IPv6 transition and education/knowledge dissemination in favour of social acceptability. These priorities represent social interests, develop the competitiveness of enterprises, as well as they promote the transfer of technology into special regions (Central and Eastern Europe, Russia, etc.).

Trust, Security, Privacy, Identity

The 'Internet Security' part of the initiative will cover methods and tools to protect critical informatics infrastructures, to analyze security incidents and to maintain software security. New types of secure routing will be developed in wired and mobile networks. Network coding will be applied to distributed secure data storage. Cryptographic algorithms and solutions will be developed for network security including RFID based systems and the mobile Internet. The program will be open to SME participation in order to develop solutions, which can be applied in environments, where informatics expertise is not available at a sufficiently high level.

Future Internet Research and Experimentation

The flagship project of the initiative is the development of a Future Internet network testbed. In it, with the use of virtual sub-networks, experiments can be performed under realistic conditions. Methods and

procedures elaborated in the course of other tasks can be tested or analyzed. The network testbed will contain elements which are compatible and connected to the major European Future Internet Testbeds. The core of the Hungarian testbed will be designed along the concepts of the FEDERICA project, while the access network part will contain PlanetLab like nodes and will be federated with the European OneLab project. The backbone of the system is the so called hybrid IP-optic network. This offers – in addition to the dual IPv6/IPv4 unicast/multicast operation – the possibility of dedicated point-to-point optical connections, thus ensuring cutting edge technology for research.

The Hungarian Initiative will also contain a mobile testbed part. During the last four years a mobile innovation centre has been established in Budapest, which has integrated testbeds for various types of mobility. The test environment helps researchers and engineers to test their new solutions and new applications. The centre already participated in the IST-FP6 ANEMONE project and provided an open testbed for the researcher/developer community to support future developments. In the new initiative this mobility testbed will be extended and federated with the fixed network testbed.

The fixed and mobile testbed parts will be complemented with an active/passive measurement infrastructure. The system will be similar to those deployed within the OneLab2 project by the Hungarian participants. The active monitoring component is based on the ETOMIC infrastructure, whereas the passive monitoring component is based on the COMO monitoring system developed in OneLab. In addition, the active and passive monitoring component will be managed by the ETOMIC and COMO Central Management Systems.

Expected Impact

Promoting Future Internet related research programs are a key for Hungary to keep steps with the European and worldwide research activities taking into account the Hungarian capabilities and strength. It is also important to strengthen the ICT industry involved in the initiative.

Involved constituency

The scientific content of the initiative is shaped in cooperation with the National Information Infrastructure Development Institute. This Institution is implementing the National Information Infrastructure Development (NIIF) Program and serves as a framework for the development and operation of the research network in Hungary.

The beneficiary of the initiative are:

— Business enterprises with legal entity and cooperatives registered in Hungary;

— Foreign-registered enterprises with branch office in Hungary;

— Non-profit organisations with legal entity

⎯ Public bodies or their institutes with legal entity (Higher Education, Research Institutes)

4.8.8. mindenki

Overall Scope

Key Information

Runs from: Jan. 2009 – Jan. 2014 (60 months)

Website(s): www.mindenki.hu

Summary

The project permits users to download their own personality, using interaction connected to the content. By defining their relation to the contents, the users process them jointly at the same time. In the background a Relevancy Network is constructed between the users and the contents, which is a significance based, web 3.0 semantic web. By means of the Relevancy Network, a new generation content recommendation system is operated, that is able to define content distance between certain elements. This recommendation is not a sales driven process functioning in a closed system, that is in action in order to sell some website product. This is a user driven process, where the digital personality is managed by the user, in order to access person-specific content. This way the user is not obliged to browse the internet, since the relevancy dns is able to collect contents of interest from the whole spectrum of the web. The Relevancy Network is an organic system, permanently molded by the users, in which knowledge, gained from interaction is spread the same way as in the nervous system. 'Mindenki' connects Long tail contents in an integrated cross-reference system.

Objectives

⎯ Open access for everybody to person-specific content, in such a way that the user would not have to search for relevant content, rather the content could find the user

⎯ Create a significance based cross-reference network between the contents, by means of user-content interaction.

Highlights

Innovate use of semantic web

The underlying Relevancy Network is not a rigid, predefined structure as semantic web was originally pictured but an organic, continuously evolving entity. The embedded knowledge of the network is enhanced by interactions with users. This does not require dedicated processing resources, rather it utilises high level information created by minimal interactions of motivated users. Knowledge items are thus created automatically in connection with the very elements the users deal with. In the Relevancy

Network the meaning of each element is defined by all connected elements, thus the meaning of information is defined by the connections. The result is a constantly updated adaptive network.

Friendly for the digital environment

Current media surfaces are flooded with contents promoted to reach the largest audience possible. Examples include online ads, banners, even contents reaching the first page using SEO. In reality, these moderately relevant contents represent a contamination of our digital environment. Relevancy network integrated into the content consumption value chain will help to liberate future's Internet from the pollution of irrelevant content. In Future Internet there is no need to "carpet bomb" 50% of the users to reach the interested 5%. Future online offers will be perceived by targeted users as useful information, rather than unsolicited ads.

Mindenki.hu, the strategic relevance and pilot implementations in place

The pilot implementation of the Relevancy Network is the mindenki.hu site, which is a similarity based community site with more than 20 thousand users. It is of strategic importance in Relevance Network development. Users generate and process content in a Web 2.0 manner. Users can submit questions complete with N possible answers, of which other users can choose the best fitting one. From the answers the system will calculate a similarity map of users, which will show the most similar users as the closest to each other.

Behind the web 2.0 user interface, there is a web 3.0 relevancy engine also capable of finding most relevant content. The next phase of the project will aim to build a generic Relevancy Network leveraging experiences collected during this pilot.

Contextual cross-references

The mindenki project is capable of content recommendation on virtually any thematic area and across domains.

Relevancy bridges over regional and national borders

The Relevancy Network created by user interaction is by its nature a language and region independent solution. Similary and Relevancy is not necessarily correlated with physical proximity, existing personal relationship and not constrained by geographic, cultural, ethnical and other borders. It is quite possible, that the most similar user of the network lives across the globe and comes from a completely different cultural background.

R&D Scope

Innovative Development

The definition of the content in the form of tags takes place not only with the active participation of users, but also in the background through processing the interactions between users and contents. Beyond

matrix factorisation commonly used in recommendation engines, we also adapted other methods to process content tags. E.g. tags "stick" to users who are involved with them like pollen to the bee that flies from flower to flower. This mechanism is modelled after the strengthening and weakening processes that take place in the neuron network of the nervous system. If, for example, I and my preferred content also bear a tag, then the value of the tag will increase at both of us. This means that I and the content mutually define each other without me having had to make an active processing effort. Thus the users need not be confronted with the internal complexity of the system.

Advanced Internet Technology

We do not intend to dedicate resources to develop technologies already available on the Net. There are several methods for collecting user interactions like existing bookmarking, sharing and "like" solutions, proprietary APIs and widgets embedded into web pages, html5 applications running as an additional layer in the web browser. Also, we utilize various standard identity management solutions (eg: OpenID, Facebook, Windows Live ID, AOL, Indapass). Adopted semantic web standards: a RDF (W3C's Resource Description Framework) is the natural representation language for our relevancy network. Information about the nodes can be stored efficiently in a RDBMS (Relational DB) along with statistics or any kind of additional data. Mindenki.hu web services interface uses state of the art markup languages, like APML (Attention Profiling Mark-up Language).

Expected Impact

Contraction of the Digital Divide by means of direct connections

Digital divide is not only affecting those cut off from communication technology, but also those that are unable to use devices at a high level. At the moment a wide range of users consume mainstream contents, only because current information technology does not provide support for the access of contents of personal interests. For those who have low access to information technology, increase of device efficiency can be of critical importance in the attainment of contents. The Relevancy Network makes the person-specific content widely accessible, which reduces the digital divide. 'Mindenki' elevates the user to hard-to-reach,though relevant contents.

Societal impacts – lowering communication entropy

The babelian confusion of vertical communication of a fragmented, isolated specialized society can be avoided by a horizontal cross reference, which is capable to create a semantical link between persons and contents.

Societal impacts – the development of our independent personality against mass media

We live isolated in metropolises with superficial relationships with a special few while there is limited means to find others with similar interest. Access to content in essence depends on the amount of energy dedicated to find relevant content in the massive stream of messages of the consumer society. This may

lead to eventual subjection to mass media, and we do not form our personal channels on the long tail side of content. Consumption of mass media may result in identifying ourselves with large groups, accepting its views and opinion. This Future Internet concept helps us to develop our own individual less manipulable personality by defining our own relation to the Content.

Societal impacts – Unifying the advantages of Push & pull media

Currently there are two elecronic media which differ in respect of media access: the television a pull and the Internet, a push medium. The concept enables the unification of the ease of access of the pull media with the quality of information resulting from an active search.

Societal impacts - Nincs Privacy probléma

Unlike facebook's like button, the user shares his content preferences only with the Relevancy Network.

Universal usability and access

All technologies utilized serve the purpose of universal accessibility. The very nature of the interaction collection ensures that any information acquired in any language contribute to a common knowledge base that is immediately available across the system.

Contribution in the member state, region

The project is expecting venture capital from the Jeremie fund (Joint European Resources for Micro to Medium Enterprises), a joint initiative of the European Committee and EIB/EIF. The investment process would be greatly accelerated by winning the Future Internet Award.

Involved Constituency

Pilot implementation in place

The pilot currently operating is testing the Relevancy Network by involving local communities. Up to now more than 20 thousand citizens have been involved from all over Hungary, have written more than 12 thousand questions for which almost 6 million answers have been sent. This means that on the average, more than 250 thousand questions have been answered by the users. The main input to the system's development has been constant feedback on the part of the numerous citizens involved in the pilot project.

University research

Media-theoretical research for the future internet idea implemented by the 'Mindenki' project, took place at the departments Intermedia and Doctor of Liberal Arts of the Hungarian University of Fine Arts.

4.8.9. NonStopLive.com

Overall Scope

Key Information

Runs from: August 2009 – Nov. 2010 (15 months)

Website(s): http://NonStopLive.com

Summary

Content can be embedded into any website. Standardized platform, quick development. Affiliate program, commission system.

Communication with the website's server via live connection: live databases, immediate content update. Chat, Video Chat.

Building up global expert network, link experts' knowledge with users' questions through automated system. Dyamic load sharing of servers in order to easily expand the cluster in case of increasing number of visits.

Objectives

— online counselling with our Experts via live chat, live video-chat or messages

— our experts are able to use the site to earn money from anywhere in the world

— connect people's problems with our Experts' knowledge

Highlights

Content can be embedded into any website independently of operation system and browser. Reloading page is not necessary as database is updated automatically and changes are shown automatically on users' side too.

System is based on a custom Java application server, which is similar to the operation system's user interface that users are get used to.

These features contribute to reducing Digital Divide as our website and software can be used with basic configurations.

Any function can be used without leaving the landing page.

Users' personal data is being protected against external attacks as we use secure channel for all the important data communication.

R&D Scope

— Java: our system based on java application

⸺ socket: for the live communication

⸺ Adobe Flash: for the special controls

⸺ ActionScript 3: Flash development language

⸺ Data Base: MySQL

⸺ JavaScript: renders the graphical user interface

⸺ Crossdomain functions: to communicate with different domains

Expected Impact

Innovations presented in Highlights help the elimination of the digital divide, since most users can already use the website and the software with the cheapest configuration.

Involved Constituency

The largest Hungarian publishers are among the supporters of the project (Axel Springer, Ringier, Sanoma, Pannon Lapok Társasága, Maquard Média), one of the leading local telecommunication company (T-Com), and also professional lobby associations like Hungarian Bar Association, the Hungarian Medical Chamber.

The main point of professional partnership is that we prepare opportunity of a highlighted issue for the members of the exact industry sector on our website, as well as help to their experts learn the system and the daily use towards the easier and more effective work.

As a result, we create a new industry that allows anyone to get lucrative profession via the internet.

On long term basis the project might affect to the conformation of unemployment, as the start-up cost of a company is the lowest, here.

4.8.10. T-City Szolnok

Overall Scope

Key Information

Runs from: May 2009 – ongoing (ongoing)

Website(s): www.t-city.hu

Summary

T-City is a long-term development and innovative programme of Magyar Telekom NyRt. and the city of Szolnok. The project started on 20th May 2009. The citizens, companies and institutes of Szolnok can test

the new services and products of Magyar Telekom NyRt., and they can discover the advantages of the internet based information society. We organize tests on the following fields of life: convenience, culture, education, health, security.

The tests are being organized within the confines of T-City Home Lab.

As a reduction of the Digital Divide, we offer Internet Academy events for older citizens, and T-City Kids trainings for children.

Objectives

— Creating a Digital City, on the backbone of internet we provide new solutions for citizens, employees, students, city services.

— Testing new ICT services and products under real circumstances, assigning the directions of further developments together with the citizens and small/medium enterprises.

— Reducing the Digital Divide

Highlights

Separate projects compose the "T-City idea", which are act on the aims of the programme. Two main objectives lead to the realization of the digital city: the reducing of the Digital Divine, and the launch of the new, innovative solutions.

We reducing the Digital Divine by educating the children at T-City Kids trainings, and by teaching the elderly citizens at Internet Academies. In these education programmes our partners are the schools of Szolnok, and the Civil Supplier Centre of Szolnok.

We organize tests and pilot projects on the following internet based fields of life:

— convenience (Future Store),

— culture (IP broadcast system),

— education (Visuland),

— health (Panic Button, Fetaphon),

— security (SmartHome Security, City Guard, RFID School Admission System, Surveillance system)

The project is unique in Hungary. Magyar Telekom NyRt. as a leader of the programme works together with the local government of Szolnok, calling in many local governmental and local organizations to the different projects.

The testing of our solutions effected the usage of many technological novelties, and new ways of using existing technologies. During these projects we developed close co-operation with the local education institutes, with the actors of the local sports life, with the police, with the different special institutions of

the local government, with cultural institutions. During the tests, we built special partnerships with the suppliers of Magyar Telekom NyRt.

The main grantees of the programme are the citizens of Szolnok. They can feedback their experiences on various channels, and we can develop the services regarding to these feedbacks.

R&D Scope

Convenience: Future Store (intelligent cash register; electronic shelf label, intelligent scale, mobile coupon, Bluetooth totem; information kiosk; wine kiosk, price control kiosk, self scanner, shop tv, mobile payment)

Education: Visuland (education in virtual reality, WEB 2 technology)

Health:

— Panic button (the user can start an emergency call via mobile technology, to an advanced medical call center in emergency situations. The positioning of the user can be based on cell information or GPS coordinates),

— Fetaphon (with this equipment it is possible to monitor the child's hearth rate at home during the pregnancy, and send the data via mobile phone to a medical call center to analyse it)

Security:

— SmartHome Security (self surveillance service, Zigbee enabled sensors make up a wireless sensor mesh network that gathers information from the house and sends it to the user via e-mail or sms)

— City Guard (surveillance system with license plate identification. The data is processed in the central system, and warnings are being sent direct to the police),

— RFID School Admission System (using RFID technology for the admission to school. It can provide the parent with additional information about the child's class schedule, about arriving, leaving time etc. via internet or sms. Additional modules: library information and lending system; luncheon voucher system)

— Surveillance system

Culture: IP Broadcast System (allows the users to follow the broadcasted events via the web, and search in the archives. The handling of the system, do not require professional staff, so it is possible to broadcast many more events than before.)

Expected Impact

We offer T-City programme for the city of Szolnok, for the citizens and for the local enterprises and institutions.

The main aim of the programme's educational events is to reduce the Digital Divine, and to introduce the infocommunication and the world of the Internet for the children and for the elderly.

We launched different solutions to help develop the security and the public safety (RFID based school admission system, Surveillance system, City Guard, SmartHome Security). Another group of our solutions makes everyday life easier, as leading the user to the world of e-health, e-learning, and e-society.

Involved Constituency

Partnership is the main trait of our programme. Magyar Telekom NyRt. supports the project from the technical side, while the local government of Szolnok supports the implementations in the city.

Magyar Telekom NyRt. tries to focus on the future partnership with the industrial partners and SME's, so we don't sign classic supplier's contracts with them. Because of this fact, both sides give resources to the project during the implementation.

Some of our projects are being implemented from R+D sources. In these projects we work together with research labs and with universities.

The aim of the Home Lab projects is to create a product or service, which can be launched to the mass market.

We receive huge help from the city during the implementation of the different solutions. They help us during the negotiations with the different local institutions and enterprises. They also help us in the communication of the different projects, in the implementation and during the follow-up of the projects.

Consequently, the realizations of the different projects come into existence as a result of wide alliance, not along different financial interests.

4.8.11. VirCA

Overall Scope

Key Information

Full name: Virtual Collaboration Arena

Runs from: Oct. 2008 – April 2011 (31 months)

Website(s): http://www.virca.hu

Summary

VirCA is an Internet-based network and toolkit that provides collaboration and knowledge sharing for laboratories and other R&D facilities. Combining advanced technologies (3D content management, ICE, CORBA, RT-Middleware), we propose a future platform for internet of things, where these "things" are capable of providing their own 3D representation, share the coupled real functionalities and remote capabilities, allows distant co-operators (human or intelligent devices) to use them in creative assemblies for building complex system in a plug and play manner. From the aspect of 3D internet and media, VirCA contributes in the sense that connects the reality and the 3D virtuality together in a kind of augmented collaboration. The manipulation of the 3D content of the today internet using keyboard and mouse is clumsy therefore VirCA provides surface for cognitive infocommunication devices that makes "3D Internet" applications effective and comfortable.

Objectives

— To provide a pilot solution for a future collaborative platform where information, functionality, remote capabilities and 3D representation of things are freely manipulable and integrable.

— To integrate and implement the concept of cognitive infocommunications to enhance the manipulation and communication with 3D content.

— To provide fast knowledge transfer between academic laboratories and R&D facilities.

Highlights

iSpace laboratory Network

We established the iSpace Laboratory Network which uses VirCA as cooperation platform. VirCA is readily installed or under installation at the following member organizations: BME (www.bme.hu), Széchenyi István University (http://uni.sze.hu), ELTE (www.elte.hu), University of Debrecen (www.unideb.hu), TUKE (www.tuke.sk), Tokyo University (http://dfs.iis.u-tokyo.ac.jp), Chuo University (http://www2.chuo-u.ac.jp), NUC (http://www.hin.no), NTNU (www.ntnu.edu) and PPM (http://www.ppm.no/). VirCA is an ongoing development but already serves as a background of intensive cross-national or even cross-continental scientific cooperation.

Fast knowledge transfer

VirCA provides virtual environment where the laboratories can share their physical and Intelligence devices and other partners can use them collaboratively in a semi-virtual manner. iSpace memeber organizations are doing multilateral research activity utilizing VirCA.

R&D cost reduction and efficiency enhancement

The remote integrability of the mutually complementary knowledge- and device-base of different laboratories minimizes the necessity of duplication and thus the inherent time expenditure. Regarding the benefits of multilateral, 3D virtual collaboration the actual demand of business travelling and

transportation can be reduced dramatically: pre-purchase discussion, testing and evaluation process could be done in VirCA.

Interdisciplinary cooperation

The modular structure of VirCA supports the knowledge transfer between academic disciplines e.g. a robotics researcher can use the results of a cognitive scientist easily due the interconnectable building blocks provided by individual researchers or companies.

Pilot implementation

In MTA SZTAKI, we set up a powerful immersive 3D demonstration site equipped with high-end Imersive 3D CAVE technology. In this laboratory the features of VirCA idea can be presented but the software can work on a normal PC as well.

R&D Scope

— Open for Cognitive Infocommunication Devices

— VirCA use CORBA and ICE (Internet Communication Engine).

— Our software covers the current cutting edge 3D visualization technologies what the future internet visualization will be based on expectedly.

Expected Impact

VirCA potentially...

— ...give community access to an aggregated/cumulated knowledge-base.

— ...underlay the basis of the "plug and play knowledge"

— ...breed general changes in cooperative R&D, everyday engineering or even entertainment habits

— ...shows perspective to the IT companies

— ...generates significant development in international scientific collaboration

Involved Constituency

In this section we collect and describe the organizations and academic partnerships where VirCA system plays important role.

iSpace Laboratory Network (www.ispace-labnet.org):

The iSpace Laboratory Network is a worldwide scientific non-profit network of professors, researchers and laboratories engaging in active research in the intelligent space-related areas.

ITM - Emerging Information Technology In Manufacturing (www.itm-lab.org):

The Joint Laboratory for Emerging Information Technology in Manufacturing (ITM) was established in Budapest in 2004. ITM is a Norwegian-Hungarian laboratory and was established on the rectoral and directorial level of universities, research institutes and a high tech industrial company. ITM represents a strong link between basic research and industrial applications and is capable of coordinating top-level international education and research-based innovation in informatics, automation, intelligent systems in addition to advanced sensor- and robot technology. Based on this unique potential, ITM formed its holistic goal "to be the Norwegian and Hungarian reference research centre within Highly Intelligent and Flexible Robotics for unstructured environments". ITM's strategy is to merge the top-level knowledge and experience of each of the partners into a complete research arena containing scientists, professors, researchers, graduated students and laboratory facilities, in order to conduct state-of-the-art research.

3DICC (3D Internet Communication and Control) Consortium:

3DICC is the consortium of BME – Department of Telecommunications and Media Informatics and MTA SZTAKI Cognitive Informatics Research Laboratory. This consortium operates a 120 square meter laboratory equipped with an immersive 3D CAVE system and a full body motion capture device. The laboratory established from about 1 million Euro.

4.8.12. Visuland

Overall Scope

Key Information

Runs from: 2008 – 2012 (48 months)

Website(s): http://visuland.biz/

Summary

We built Visuland to put the teaching and learning activities into an enviroment that is familiar and loveable for the new generation and make learning fun and entertaining. We integrated all the present communication forms, the Skype's, YouTube's, Power point's functionalities for the maximum usability and online games for entertaining purposes.

Visuland is perfect for any kind of communities (social portals, schools, teachers, companies) where people, friends, students, employes want to get together with One-Click - without any long downloading, long installation and registration process. They can talk there like in real life, they can make presentations, watch galleries for videos, or realtime sport events together. Or simply play with each-other.

1 minute overview : http://www.youtube.com/watch?v=C2i7jrPF2co

Visuland in practice : http://www.youtube.com/watch?v=Bs8VB7ksj3M

Our innovation is how to develop all the present popular tools (Skype, YoutTube, Power Point) and 3D games and technologies and put it together into one 20Mbyte system that will run also in low-end computers.

Objectives

— Entertaining and efficient teaching/learning for the internet generation

— Get people together without boundaries (friends, family and different community members)

— Maximum usability on low-end computers also for students in third World countries

Highlights

— We managed to build a hihg-end communication softwer which integrates the Skype's, YouTube's and power point's functionalities into One system.

— Visuland has won the Hungarian Telecom (T-COM) prototype competition

— Visuland has **contract with T-COM** to be part of T-COM's T-City project

— Visuland **has been implemented in elementary school** for pilot and children loved it

— Visuland beats the distance between teachers and students literally and in figurative sense

— Visuland **offers the option for cross-regional, cross-national teaching**, making "brother classes" where specialized teachers from different schools can teach other teachers' class in their subjects.

Expected Impact

Visuland can have big social impact by **reducing the distance between teachers and students** even in space (physically) and even in time (generation gap) and makes available for anybody to participating in any kind of class all over the world.

Visuland also contains several games that **has the chance to integrate people into communities** with the power of sharing entertaining times together.

:
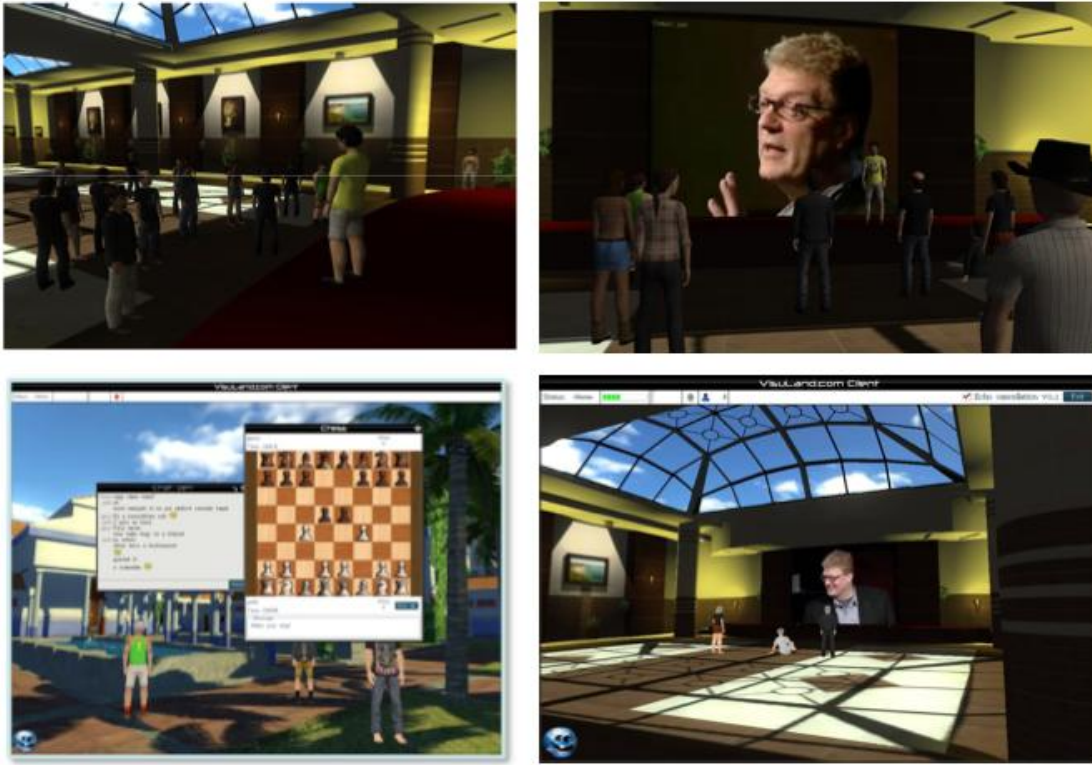
4.8.13. 3G Multimedia / Gaudio

Overall Scope

Key Information

Runs from: June 2010 – Dec. 2010 (6 months)

Website(s): www.gaud.io

Summary

Our project is a stream based music solution with a great new user experience to fulfil the following need of the people: Listen to any music you like anytime, anywhere and even benefit from doing so!

What makes gaudio so revolutionary is the "Mood" and the "You play, we pay" approach we embrace integrated into a music solution in a new way that can create the buzz straight away.

"Your Mood, your music" : Just enter your current mood criteria and an endless flow of tracks you wanted to hear start to play – yes it can also be an artist! Based on behaviour recommendation Your personal data and taste modifies the tracks coming your way. You can edit your channels and save them – still the tracks played will fit your present mood!

"You play, we pay!: Every activity one does using the system, from as simple as listening to music to buying a ticket through their mobile phone, will result in a increasing balance of benefit points, that can be used to unlock new features, enter games, gain more invitation possibilities and more.

Objectives

— Launch of demo service (beta): January 1st 2011

— Number of streamable audio tracks in 1st year: 1 million

— Number of countries where services are launched in 1st year of operation: min. 6

Highlights

1) Under the radar territories and community: Our phase one action plan (2011 and 2012) is to concentrate on Central and Eastern Europe, creating Polish, Russian, Turkish, Czech, Romanian, Bulgarian, etc. language versions.

Our phase 1 strategic target audience are communities (mainly in Western Europe) working and living far from their homeland. With strong local repertoire for them we are to serve the ones a very few think of .

2) Gaming: Nobody on the market combines music with gaming, the 2 natural behaviour of an average young computer / mobile phone user. 3GM, by doing so can be more popular, thus the 1st choice of users to fulfil their hunger for music.

3) Do not quit when leaving home: One system, many platforms - available for all major mobile operating systems - that identify the same user and auto update profiles, playlists, etc. One will not need to synchronize, can even upload own songs and have the same endless library wherever she/he goes.

4) User experience: learning all the best practices from others we are to create functionalities, features and UI better than the best available.

R&D Scope

We are among the very few delivering a stream based solution on Microsoft platforms operating in the cloud. Already with an application to the Windows Phone 7 platform we are using the most recent technologies.

Expected Impact

We are to give a great solution to the fast-changing music listening habits of people. Personalization is the future of Radio and it gives the right answer to:

— The people as they will only hear music the like

— The media and the people reducing advertising noise to relevant, needed information

— The music industry giving an appealing legal alternative

— Our CEE region, delivering a solution to the countries hungry for such an opportunity

— The migrants of Western Europe giving them what they desire fro – and helping them to integrate while preserving their roots.

Involved Constituency

The project is supported by the European Union regional fund. We are also working very closely with organizations responsible for co-operation among ICT companies and embrace all ideas of such co-operations. One of those is that are to give our users targeted concert opportunities based on their music listening habits Working with an other company active in the CEE region.

Our solution is open to all industry collaborations and we are ready to serve as a white label provider as well enabling any brands to give the opportunity to their clients.

4.9. Ireland

4.9.1. FI Forum & IPv6 Taskforce

Overall Scope

Irish Future Internet Forum

The Irish Future Internet Forum (IFIF) held its first meeting on 29 October 2008, in the Digital Exchange, Dublin, Ireland.

The IFIF was established by the Telecommunications Software and Systems Group at Waterford Institute of Technology, with the purpose of bringing the Irish ICT research community together in a common forum that would facilitate the discussion and knowledge transfer of issues related to Future Internet activities in the EU and globally. At the first meeting of the IFIF, 160 participants from Government, Industry and Academia met and discussed a number of topics related to FI, according to two common themes "Global Perspectives" and "Positioning Ireland at the centre of the Future Internet".

The purpose of the "Global Perspectives" session was to stimulate a debate with the registered attendees about global FI initiatives and developments. The following provides an overview of the presenters and presentations; all presentation material is available to registered IFIF members, via the IFIF web site.

— Dr. William Donnelly, Head of Research and Innovation, Waterford Institute of Technology "Introduction" covering scope and goals of the IFIF.

— Dr.-Ing. Rainer Zimmerman, Head of Unit, Future Networks, European Commission, DG Information Society and Media "EU R&D Perspectives in Future Networks"

— Mícheál Ó Foghlú, Executive Director Research, Telecommunications Software and Systems Group, Waterford Institute of Technology "Future Internet Visions: An opportunity for Ireland"

— Dr. Ryutaro Kawamura, National Institute of Information and Communications Technology, Japan. "NWGN (New-Generation Network) Research Challenges in Japan"

The purpose of the "Positioning Ireland at the centre of the Future Internet" session was to discuss how Irish researchers can integrate their work with the core focus areas of the Future Internet. The following presentations were made at that session:

— Sam Samuel, Executive Director Bell Labs Ireland and UK, Alcatel-Lucent "Next Generation Internet" (the GENI/NSF view)

— David Kennedy, Director of Eurescom. Chair of the inter-ETP working group on Future Internet. "FIRE, the Future Internet and the European ICT Industry"

— John Strassner, Chair of the Autonomic Communications Forum "Ireland and the Future Internet"

The overall workshop was well received, and many attendees have expressed an interest in follow on workshops and seminars following the FI focus. To that end it is planned to have two upcoming IFIF events later in 2009, one focusing on Services and one focusing on Security.

The TSSG group, founders of the IFIF are engaged in a number of FIA working groups, and the IFIF will have a booth at the upcoming FIA event in Prague.

It is envisaged that the IFIF will allow Irish industrial and academic partners to engage in discussions that will lead to new research initiatives related to FIA, for example generating high quality FP7 proposals in this research space. This work has already started with the TSSG group ensuring that, wherever possible, FP7 proposals produced by the group include 1-2 Irish partners.

Irish IPv6 Task Force

The Irish IPv6 Task Force was set up in 2004, chaired by Mícheál Ó Foghlú of the TSSG. The Irish National IPv6 Centre was set up in 2005 as a collaboration between the TSSG in Waterford Institute of Technology, the Hamilton Institute in NUI Maynooth, BT Ireland and HEAnet. The role of these organisations is to encourage the transition of the Irish network to IPv6 to allow continued growth of the Internet and its services in Ireland.

The flagship event of 28th January 2009, the Irish IPv6 Summit, showcased the work done to date, and the considerable work that still needs to be done, to achieve these goals. The on-line agenda contains links to streaming video of all the presentations.

⸺ Minister Eamon Ryan, (DCENR) Opening Address

⸺ Mícheál Ó Foghlú, (Chair, Irish IPv6 TF) Welcome Address

⸺ Fred Baker, Cisco Fellow, Chair IETF IPv6 Operations Working Group (Cisco) KEYNOTE: IPv4/IPv6 Transition Status and Recommendations

⸺ John Boland, CEO (HEAnet) Peak IPv4: The Case for IPv6

⸺ Niall Murphy, (Google) Google and IPv6

⸺ IPv6: Finding the Business Value Dave Northey, Principal Systems Engineer, Developer & Platform Group, (Microsoft Ireland)

⸺ Giorgio Lembo, Head of Research and Development (Tiscali International Networks) IPv6 Services in Tiscali

⸺ Detlef Eckert, Advisor DG-INFSO (EU Commission) KEYNOTE: European IPv6 Promotion

⸺ John King, BT Design – IP Technologies Consultant (BT) IPv6 in BT – the story so far

⸺ Zoltan Gelencser, CTO Network Solutions (Hutchison3G UK) IPv6 in Mobile and Fixed Mobile Converged Environment

⸺ Ross Chandler, IP Network Architect (Eircom) Service provider planning for the IPv6 Internet

⸺ David Malone, (NUI Maynooth) Don't be afraid of IPv6

⸺ Nick Hilliard, (Dublin INEX) IPv6 Usage in Ireland

It is very important for those interested in the Future Internet to realise that a successful transition from IPv4 to IPv6 in the next 5 years (from 2009-2013) is essential to ensure the ongoing growth of the Internet and its services. Whilst other more innovative ideas for Future Internet are worthy, none can up with an immediate deployable solution to the impending crisis for the IPv4 Internet when the address space starts to run out with the last IANA /8 block being anticipated to be allocated in late 2010, or early 20111.

Thus Future Internet activity needs to be about IPv6 and other potential alternatives post-IPv6. Any focus on longer term Future Internet activity cannot be allowed to detract from this very real shorter-term issue.

R&D Scope

The Irish Future Internet Forum is primarily focused on addressing the following issues:

⸺ Network Architecture

⸺ Service Architecture

⸺ Trust, Security, Privacy, Identity

— Internet of "things"

Expected impact

"Building Ireland's Smart Economy" defines the national strategy for the economic development of Ireland over the next five years. A key objective of this strategy is to position Ireland as a research and innovation hub for Europe.

The Irish Future Internet Forum recognises that positioning Ireland at the forefront of the future Internet is crucial to the Ireland meeting this ambitious objective. The objective of the Irish Future Internet Forum is to promote Ireland as an early adopter of the Future Internet through

— Creation of awareness of the Future Internet and its potential impact on the Irish economy

— Promoting participation of Irish stakeholders in the European Future Internet Initiates

— Encouraging greater R&D investment in activities around the Future Internet

— Encouraging the development of test sites and trails around aspects of the future internet

— Promoting greater strategic alignment between National and European research and innovation initiatives in the Future Internet Environment

Involved constituency

The IFIF stakeholders are the Irish Government agencies, Irish Industries and academia .

No investment has been made in relation to the IFIF. The TSSG group undertook to establish the IFIF and host its inaugural meeting from internal finances. However there are a number of complimentary "Future Internet" research initiatives which are funded through the Irish funding agencies.

— Irish National IPv6 Centre established through the Department of Communications, Energy and Natural Resources (DCENR)

— The Irish Security Research Network (Serenity) was established by Enterprise Ireland and works in cooperation with Invest NI to promote the FP7 Security programme on the island of Ireland. The network currently has 547 participants with approximately 250 from industry, 192 from academia and 105 others (including civil servants; industrial development agencies; police/end-users; industrial associations; lobby groups; etc). It is an all-island network with 35 participants from Northern Ireland. The industry breakdown is that 201 participants are from SMEs with the balance of 49 employed by large industry (IBM Ireland, Intel, etc). Many of the SMEs are IT oriented. The Network provides information, facilitates meetings and generally promotes the civil security R&D agenda in Ireland. The potential to develop a viable commercial security sector is being actively

pursued. An important new initiative associated with the network is the creation of the Centre for Irish and European Security with particularly emphasis on the security R&D agenda.

— Science Foundation Ireland (SFI) Research Cluster "The Federated, Autonomic Management of End-to-end Communication Services (FAME)" It bring together the major Irish based academic (TCD, NUIM, UCD) and industry (CISCO, IBM, Alcatel Lucent and Ericsson) players in the telecommunications management space.

— Higher Education Project Serving Society: Management of Future Communications Networks and Services investing the management of user centric services in Next Generation Networks (Future Internet). The academic partners are Interaction Design Centre in the University of Limerick and the Hamilton Institute in Maynooth University.

Other national research clusters that are relevant to the Future Internet Initiative:

— The Centre for Telecommunications Value-Chain Research (CTVR) brings together a multi-disciplinary group of researchers drawn from many Irish Universities together with a carefully chosen set of industrial partners to work on those engineering and scientific challenges that will make the most difference to the telecommunications networks of the future

— The Digital Enterprise Research Institute (DERI) the leading international web science and semantic web research institute located at Galway University

4.9.2. Future Comm

Overall Scope

Key Information

Runs from: Oct. 2008 – Oct. 2012 (48 months)

Website(s): http://futurecomm.tssg.org/

Summary

As the move towards convergence of communications networks gains momentum, the academic and industrial research community is increasingly focussed on the evolution of networking technologies to enable the "Future Internet." However, we believe that addressing evolution of networking technologies in isolation is not enough. Instead, it is necessary to take a holistic approach to address the issues of communications services, their societal drivers and the requirements they place on the heterogeneous communications infrastructure. The three programme partners have strong track record in the areas of: communications network and service management (WIT-TSSG); network performance analysis (NUIM-Ham); interaction design and usability (UL IDC); and analysis of usage patterns of ICTs (NUIM-Soc). They are ideally positioned to collaborate on the development of a framework for creation, deployment and management of communications services that serve societal needs.

Objectives

— Specify models, algorithms and processes that, when applied to service execution environments, will allow communications services to adapt their behaviour based on contextual information emanating from the underlying networking infrastructure. Furthermore, this strand will address how to facilitate service users in the creation of personalised services, possibly through orchestration of a number of pre-existing services, which can be configured to behave in accordance with particular user preferences.

— Specify models, algorithms and processes which, when deployed in the core and access networks, will collectively optimise the operation of those networks subject to constraints relating to both the current state of those networks and, crucially, relating to the business goals of network operators and the goals of users of the communications services supported by those networks. Of particular interest will be how services critical from a societal perspective (for example e-health and e-government) can be delivered across heterogeneous networks in a highly dependable manner.

— Develop models, processes and tools to aid users of communications services, individuals or social groupings, managing aspects of their interaction with each other as mediated by those services. To achieve this it will be necessary to capture and analyse information relating to social interactions between citizens and harness this information to guide the development of communications services that exhibit high levels of usability and that promote sustainability and growth of communities.

Highlights

One of the most interesting and innovative aspects of the FutureComm initiative is in its inter-disciplinary approach to the research problem. Rather than address the problems of the Future Internet from a solely technological viewpoint, instead we have attempted to address these issues from a societal perspective, and develop technology to solve these issues. We have done this by creating a consortium made up of not only communication technology experts but also experts in the field of sociology. The aim is to, through our sociology researchers, capture and analyse information relating to social interactions between citizens and then utilise this information to guide the development of communications services that exhibit high levels of usability and that promote sustainability and growth of communities.

R&D Scope

An innovative aspect of this project is the use of biologically inspired model to solve a number of issues in the Future Internet. In recent years the notion of adapting models and processes from biology to address issues in networking and communications has become popular. In Futurecomm we have developed a number of solutions using biological models. In particular we have used biologically inspired services to solve a range of problems from load balancing, to service discovery, service composition and energy

efficient data-centres. We have also used cell-based signalling mechanisms such as chemotaxis as a model for more dynamic and efficient message routing within communications networks.

Expected Impact

As an academic focused project the key impact is in furthering the state of the art in Future Internet research. This impact is measured through a number of key metrics:

— Collaborative publications in key journals and conferences, editorial positions, book publications, and professional body special interest groups.

— The development of strong PhD candidates with expertise in the area of Future Internet who can drive future internet research going forward.

— Foster the potential for real industrial deployment of solutions through engagement with the wide range of relevant standards bodies..

Involved Constituency

The project consists of three principle partner institutions: Waterford Institute of Technology Telecommunications Software & Systems Group (WIT-TSSG), NUI Maynooth Hamilton Institute (NUIM-Ham), NUI Maynooth Sociology Department (NUIM-Soc) and University of Limerick Interaction Design Centre (UL IDC), where each brings to the project a deep knowledge and expertise in a specific area. These are communications network and service management (WIT-TSSG); network performance analysis (NUIM-Ham); interaction design and usability (UL IDC); and analysis of usage patterns of ICTs (NUIM-Soc). The programme will be driven by a scenario-based methodology in which cross-partner teams work together over 6 to 12 month iterations to identify communications service usage scenarios highlighting significant technological or sociological issues. The partners will also actively engage with industry collaborators, including T-Systems (Germany), Telenor (Norway), Intel (Ireland), as well as the research institute Fraunhofer FOKUS (Germany), in the specification of scenarios relevant for the evolution of communications networks.

4.9.3. GUILD

Overall Scope

Key Information

Full Name: Generation of Urban Infrastructure from LiDAR Data

Runs from: August 2006 – Jan. 2010 (52 months)
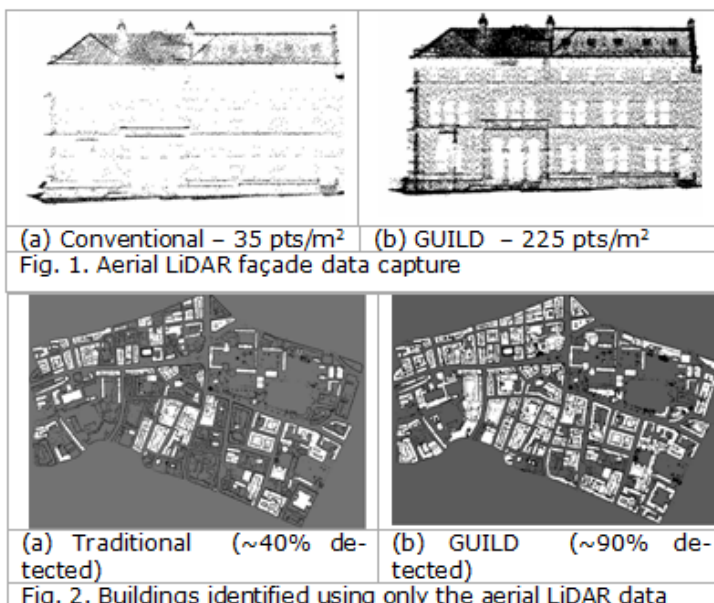
Website(s): N/A

Summary

To date, computational modelling has not been fully exploited at the neighbourhood- or city-scale, because of the expense and time required to create computational meshes for the vast quantity of buildings involved. This project (GUILD) has made fundamental breakthroughs in the auto-generation of city-scale computational modelling by creating a pipeline to convert to aerial LiDAR into Finite Element Meshes without any manual intervention and without any reliance on a prior data. The long-term vision for this work would enable anyone to log onto a Google Map type site and conduct environmental modelling for alternative energy optimization, hazard exposure, and general environmental health. The project also has significant implications for disaster management planning and response and for the construction of major infrastructure projects.

Objectives

— Optimize aerial light detection and ranging (LiDAR) data capture to better collect building façade data

— Identify the data affiliated with individual buildings without any manual intervention or a priori knowledge

— Create a robust and scalable algorithm to rapidly, accurately and cost-effectively transform LiDAR pointcloud data into a solid model suitable for computational modelling

Highlights

1. The project devised new flight path approaches, which allowed vastly improved results (fig. 1) with only minimal additional costs. This enables critical feature detection such as window identification.

2. Before a computational mesh can be generated, the data affiliated with each building must be identified and clustered. Traditionally this has been done manually or by pairing with other datasets such

(a) Conventional – 35 pts/m² (b) GUILD – 225 pts/m²
Fig. 1. Aerial LiDAR façade data capture

(a) Traditional (~40% detected) (b) GUILD (~90% detected)
Fig. 2. Buildings identified using only the aerial LiDAR data

a) Photo b) LiDAR c) GUILD solid model
Fig. 3. GUILD conversion pipeline

as maps of building footprints. This is problematic especially in a disaster management scenario where the
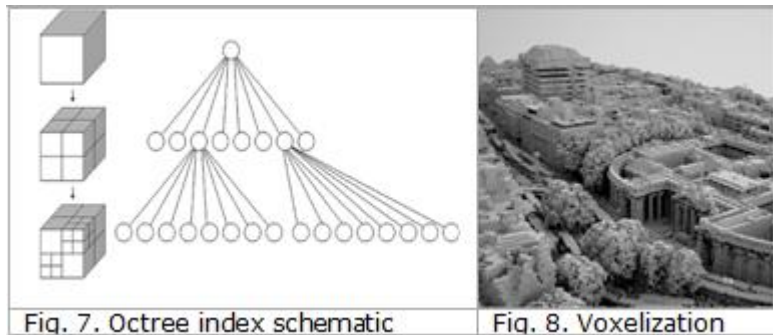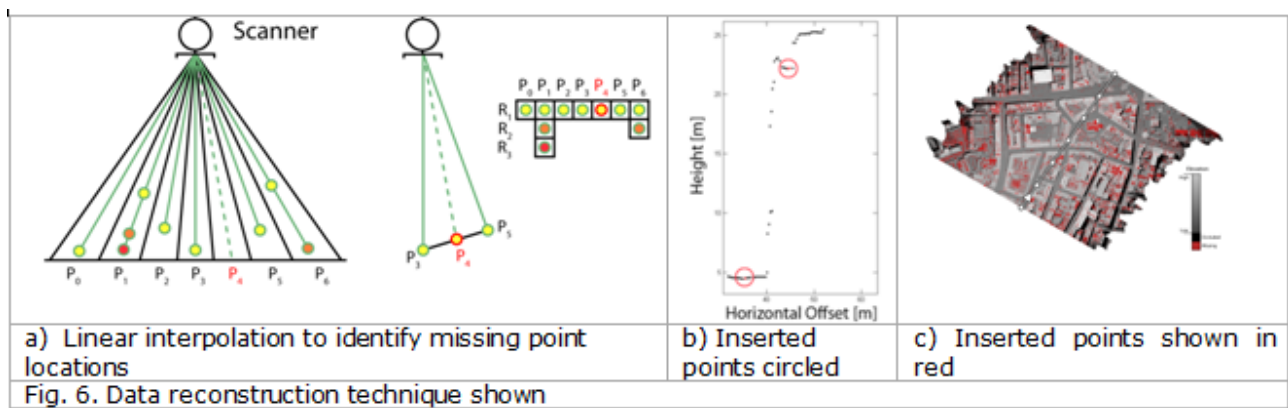
information on the ground has rapidly changed. Other techniques have not shown to be highly robust when applied to multiple building types. Work done under GUILD demonstrates a major advance.

3. The project enabled data capture and processing at 120th of the time and 1600th of the cost, while generally being within 10% accuracy. This facilitated data transformation without an a priori data that will eventually allow for a fully automated pipeline (fig. 3).

R&D Scope

The innovative developments stem from using the characteristics of the LiDAR hardware to plan and then process the LiDAR data (fig. 6) and use of voxelization and octree indexing (fig. 7) and an emphasis of

a) Linear interpolation to identify missing point locations

b) Inserted points circled

c) Inserted points shown in red

Fig. 6. Data reconstruction technique shown

Fig. 7. Octree index schematic

Fig. 8. Voxelization

Expected Impact

This project is pioneering the creation of an entirely new data set for the Internet, one that has been to date unachievable because of time and cost considerations. While virtual city models are common, they generally lack the ability for further mutability and computational analysis. A highly limited amount of work has been done with ray tracing with such models, but they are basically incompatible for further modelling work. The GUILD project transforms this (1) by generating new data sets that lay the base layer for engineering analysis, (2) by demonstrating the potential functionality of new low-cost, city-scale models, and (3) by devising highly robust, auto-generated computational models that can eventually used by engineers and non-engineers alike to improve and protect the quality of their lives. Examples range

from the relatively simple one of right-to-light analysis when new construction is proposed to more highly complicated ones such as pollution accumulation prediction from new traffic patterns. The potential impact of this breakthrough is major, and relevant applications are extremely wide.

For example, cities will be able to do significantly more accurate community-wide assessments for earthquake

Fig. 4. Aerial view, 2009 collapse of Cologne's Historical Archive, due tunnel construction.

Fig. 5. Aerial view of Barcelona's 2005, 80m long tunnel collapse displacing 1200 people.

vulnerability and better prioritization of post-disaster response. Similarly, individuals will be able to assess the viability of alternative energy installations and their optimisation. None of this can happen without city-scale computational models. To date this has been unachievable because of the cost of collecting the geometric data and its transformation. GUILD has generated the breakthrough to change all of that. Ultimately this will help individuals and communities improve the quality of life. Another example is in the tunnelling realm. Currently, when a tunnel is installed in an urban environment, empirical models dating back to the 1950s are used to predict damage for most buildings. Computational modelling is reserved for only high visibility structures. This is because of the high cost of having to survey hundreds of buildings along a tunnel's route. The negative results are well known. For London's Jubilee line 25% of the nearly 2 billion pound project went to protection and monitoring, yet structures were still damaged. Similarly, subsequent to Dublin's recent Port Tunnel construction, payouts for damage were made to 1 building in 8 along the tunnel route. Barcelona's and Cologne's damage were even more dramatic (fig. 4 and 5).

Involved Constituency

To date the project has only included the research partners [University College Dublin (lead) and Trinity College Dublin] and the subcontractor Fugro. We are just now at the stage of seeking private company involvement.

4.9.4. NDLR

Overall Scope

Key Information

Full Name: National Digital Learning Resources

Runs from: Jan. 2010 – Jan. 2011 (12 months)

Website(s): http://www.ndlr.ie

Summary

The key objective of this HEA-funded Irish National Digital Learning Resources (NDLR) service is to support sharing of digital learning resources and associated practice among the Irish academic community.

This is a unique and innovative portal and platform encourages the use, reuse and sharing of digital education resources and associated practices. The ethos of the service is that the sharing of resources, experience and information can contribute to raising awareness of best practice in teaching and learning and potentially improve efficiencies in the preparation of material by reusing and repurposing existing learning content. The NDLR enables development and sharing of digital learning resources between ALL of the Irish third level institutions. The service is a free and supports an open online community of resources designed primarily for faculty of higher education in Ireland to share their learning materials.

Objectives

— Support individual, group and community HE sector staff in the sharing of digital learning resources and associated teaching practices through a community web-portal

— Supporting open access to digital learning resources via use of the repository for storage, search and retrieval facilities;

— Promote sharing and exchange of ideas and experiences while also encouraging collaboration across the Higher Education sector through subject network communities of practice, events, and training sessions.

Highlights

The service deploys innovate use of technologies to support communication and collaborative teaching and research activities between subject discipline communities of practitioners across Ireland and internationally.

The new NDLR platform (repository and portal) launched on 14th April 2010 at the NDLR Annual Showcase event – NDLR FEST! (http://www.ndlr.ie/resources/ndlr_fest_2010.php). Since that date:

— 4, 698 learning resources have been deposited to the repository to date (this constitutes 620 % increase in the number of resources deposited since March 2010).

— 29, 191 learning resources have been downloaded from the repository since April 2010.

— 458 active contributors uploading learning resources to the repository.

— Approximately 400 users have created user profiles and are members of SMARTCoPs and other groups on the portal.

⎯ 1280 is the average number of users (or visitors) to the repository and the portal every month since deployment in April 2010.

⎯ 2290 is the average number of interactions (or hits/visits) with the repository and the portal every month since deployment in April 2010.

⎯ 28 monthly active Facebook users on the NDLR Facebook page (we have received 59 "Likes" to date. 45 from Ireland and 14 from United States, UK, India, Brazil, Australia and Spain.

Activity of its users with the 3 stage user support model, community portal and repository platform

⎯ 26 SMARTCoPs are using the NDLR learning resources

⎯ 147 local Learning Innovations Projects were developed across all subject disciplines by ALL NDLR partners in 2009 – 2010.The outputs of these LIPs will be disseminated through the Institutional Coordinators and the SMARTCoPs and ll be showcased by NDLR partner institutions at the NDLR showcase in February 2011. The NDLR supported learning innovation projects are available to view from http://www.ndlr.ie/resources/lips.php

⎯ From September 2009 – July 2010, a total of 21 national LInC projects have been funded from a total of 120 LInC applications.

⎯ NDLR co-hosted seven national and international teaching and learning events in conjunction with other higher education sectoral initiatives and professional bodies (LIN, NAIRTL, DRHEA, ILTA, IOTI Flexible Learning, OER2010 and CaRILLO 2010) to ensure the widest possible engagement and maximise the optimum impact.

⎯ There have been 13 local NDLR showcase events in national HE Teaching and Learning Centres throughout 2010 (IT Tallaght, IADT, IT Carlow, DCU, IT Tralee, Sligo IT, UL, TCD, DIT, GMIT, ITB and UCD).

⎯ NDLR has been represented at 8 International Conference and events.

Engagement of HE staff with the NDLR service supports (including the calendar of events, training programme and institutional engagement)

⎯ The NDLR Annual event (NDLR FEST!) took place on 14th April 2010 in the Science Gallery, Trinity College. This event was attended by approximately 133 attendees representing all subject disciples from ALL 21 partner institutions. 12 Project teams presented the outputs and experiences from the first round of LInC projects (these are available to view from - http://www.ndlr.ie/resources/ndlr_fest_2010.php). Thirty- three representative from the 21 NDLR Partner institutions showcased a variety of LIP projects on behalf of their institutions. The full programme and event flyer is available to view at http://www.ndlr.ie/resources/ndlr_fest_2010.php

⎯ Launch and execution of NDLR Training programme - http://www.ndlr.ie/services/servicetraining

⎯ To date over 1400 participants have attended approximately 141 training and information events that have been delivered through NDLR training programme.

⎯ Nominated for ICT Excellent award (http://www.ictexcellenceawards.ie/) and the EIRCOM Spider awards (http://www.eircomspiders.ie/) for excellence in Internet and Digital Media

⎯ The NDLR eNewsletter is subscribed to by 369 Users

R&D Scope

The NDLR is the only website of its kind serving the Irish academic community. Cross Institutional sharing of resources is in itself an innovative concept and to translate and extend this concept to a digital medium with national and international presence is an exceptional achievement. It has been recognised internationally as being a world-leader in this area. Members of the NDLR staff are in constant demand to share both the ethos and the technology at conferences and on the review panels of other national and international repository bodies. SHORTLISTED FOR OTHER AWARDS

The NDLR software platform is a bespoke system that is based on the open-source DSPACE and MAHARA platforms but has been customised for the storage of learning object. It is the first service to make use of the newly launched federated authentication service EDUGATE using Shibboleth which massively reduces the cost of managing the system by federating the access control back to the users home institution. The NDLR is the first National repository service to employ Creative Commons licensing. The NDLR is also the first repository service in the world that has been designed to be embedded within a learning environment. The platform will be released Open-Source in the coming year and is already being provided to several other Irish and International organisations. A business model for the delivery of support services based on the platform is currently in development by our technology partners Enovation Solutions. The open, standards-based architecture that the platform is based upon allows extraordinary scope for innovation and integration with a wide range of systems.

Expected Impact

⎯ Improvement of the quality of the teaching resources used within the Universities, Institutes of Technology and associated HE sector within Ireland;

⎯ Enhancement of the teaching practice associated with the use of digital learning resources within the HE sector via sharing of good practice and digital resources;

⎯ Potential reduction in the cost of teaching via sharing and reuse of digital resources in teaching across the HE sector in Ireland.

Involved Constituency

The NDLR service is overseen by a steering committee comprising representatives from the 7 Irish Universities and 4 Institutes of Technology.

To manage the day to day operation, the NDLR is supported by a small agile service management team. The NDLR core team is deliberately small so as to maximise the NDLR funding support for the contributors and communities of users. The core team works within and across the Universities and Institutes to provide advice, training, system support and promotion of best practice in developing and (re)using digital learning resources and technologies. Thus the NDLR core team consists of a (i) NDLR Manager, (ii) Service Administrator, (iii) Social networking / Collaboration Coordinator, (iv) Training Coordinator and (v) Communications Coordinator.

The NDLR functions as an embedded yet virtual organization, with institutional representatives located in 21 universities and the Institutes of Technology.

4.9.5. StratAG

Overall Scope

Key Information

Full Name: Mobile Spatial Interaction in the Future Internet of Things

Runs from: June 2011 – May 2013 (24 months)

Website(s): www.stratag.ie

Summary

Research and development of real-world applications for the Future Internet of Things is about delivering technologies built around management and access to real-time heterogeneous datasets. Analyzing these enormous volumes of data on mobile devices requires context-aware smart applications and services. 3DQ (Three Dimensional Query) is our novel mobile spatial interaction (MSI) prototype for data mining and analysis on today's location and orientation aware "smartphones" within 3D sensor web environments. Our prototype tailors a military style threat dome query calculation using MSI with hidden query removal functionality for reducing "information overload" on these off-the-shelf devices. The effect gives a more accurate and expected query result for Location-Based Services (LBS) applications by returning information on only those objects/sensor enabled "things" visible within a user's 3D field-of-view (FoV) as they move through a built environment.

Objectives

— provide a comprehensive set of web-services that could be used by any make of smartphone (e.g. iPhone, Google Android, Nokia Symbian) to perform a host of spatial interaction queries (searches) on 3D datasets containing built environment and sensor web data streams.

— collect input from onboard microphone and camera sensors about ambient noise levels (dB reading) and light levels in the city together with timestamped smartphone location and orientation data, and from this build dynamic noise pollution maps of the city that completes (with crowd sourced data) the gaps in existing static sensored noise datasets. This idea could be extended to include any additional sensors found in future generations of smartphones. E.g. sensors for CO2, NOx, Radon, volcanic ash, water quality, UV levels, temperature, pressure, etc.

— enable personalised visualisations that better portray the surrounding environmental conditions at a user's location by warping (morphing) the noise maps to show, for example, the "quietest route" from A to B through a space. Other examples of transforming cartograms can easily be envisioned when exploiting future sensor capabilities, e.g. "cleanest path" (derived from CO2, NO2 sensors), "driest path" (derived from weather sensors), etc.

Highlights

Figure 1: Threat Dome search space interacting with 3D dataset

MSI research into the "information overload" problem is ongoing, where map personalisation and other semantic based filtering mechanisms are essential to de-clutter and adapt the exploration of the real world to the processing/display limitations of mobile devices. We propose that another way to filter this information is to intelligently refine the search space. To date, the threat dome approach to visibility analysis is typically restricted to the battlefield in dedicated military applications where usually a vehicle (e.g. armoured personnel carrier) wants to know in real-time what the sight lines are to/from various target positions. In 3DQ (Three Dimensional Query) we extend contemporary 2D buffer type range query functionality found in many of today's mobile LBS applications to incorporate database objects and spaces in the vertical dimension. More specifically, we tailor the threat dome visibility query paradigm to urban environments and smartphones to give a more accurate and expected search result for LBS applications by returning information on only those objects visible within a user's 3D field-of-view (Figure 1). This effectively applies hidden query removal (HQR) functionality in 360°3D that takes into account both the elevation of the user and the 3D cityscape when calculating the 3D search space, significantly reducing display clutter and information overload on these COTS (commercial off-the-shelf) devices. Unique to 3DQ, HQR ensures that only information on those objects (e.g. buildings, floors, windows, doors, street furniture, environmental sensors, etc.) that a user can actually see from their current location (and elevation), and vice versa, get returned as results to the query. For example, new students to a university

campus can explore their surroundings by pointing their smartphones at labs, offices, and classrooms to retrieve any attribute information about these objects - answering questions such as: "Whose office window am I pointing at?" or; "Are there any CO2 sensors in my field-of-view?" or perhaps more interestingly; "Can I see any of my Facebook/Twitter Friends from where I'm sitting?" or indeed; "Can they see me?". Analogous to scenes from Star-Trek, with Spock scanning his "tri-corder" for readings of life and atmospheric conditions on some strange world, such "situation awareness" capabilities would also be very interesting to bikers, joggers, walkers, city workers, and all concerned parents and citizens alike on this world who want to know, for example, the health of their immediate environment at any point in time. Our initial 3D test beds include the NUIM university campus overlaid with weather sensors and parts of Dublin City overlaid with a sparse noise and air pollution sensor network. Preliminary work on 3DQ spatial query mechanisms has already begun with results so far published in Springer-Verlag LNCS Volume 5886, GIM International Volume 24(8), and to appear in Wiley-Blackwell Transactions in GIS Journal (TGIS) in December 2010.

R&D Scope

Geospatial information is an essential part of the backbone in both today's "web 2.0" peer-to-peer social network era and tomorrow's "web 4.0" – where it is envisioned that the Internet becomes connected to trillions of micro-sensors placed into real-world objects of all types (i.e. mechanical and non-mechanical), all with their own 128 bit IP address. In other words, an Internet of Things that collects and sends time-stamped data to the cloud every second about their location, movement, plus any number of other measureable phenomena – e.g. environmental data such as air/water quality, ambient light/noise data, energy consumption, etc. Some key research issues in this web 4.0 era requires new technology for
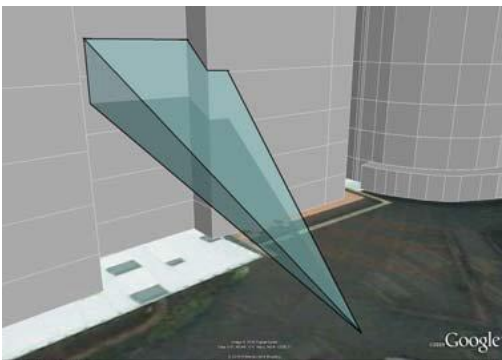

Figure 3: Visualisation of 3D frustum shape interacting with spatial database – note how HQR re-draws search space based on 3D object geometries

enabling citizens to mine, analyse, and even affect this massive web of interoperable objects – for example by remotely turning IP connected objects such as light switches or other power consuming devices on/off. In this project, we propose 3DQ as a mobile sensor web data mining tool that supports efficient capture and convenient analysis of geospatial and sensor web datasets already available today with a view to easily include Future Internet data sources as they come online. Complementing the threat dome type search above, additional functionality includes 2D and 3D point-to-select searches, 2D FoV and Isovist searches, and 3D frustum searches based on camera FoV parameters (Figure 3).

The 3DQ system is built on top of a client-server architecture, where the communications between a mobile device and the application server are achieved via Representational State Transfer (RESTful) web-services. With these services, any mobile device is free to choose a suitable programming language based

on the needs of the client-side applications and operating restrictions (e.g. in getting data from the onboard sensors), and not on the communication restrictions between the client and server. A mobile device simply sends an http request to the application server with specified parameters (e.g. current location, azimuth, tilt angles). The server then performs the corresponding spatial query in the database and returns the results via RESTful web-services in JSON, XML or SOAP formats. The smartphone parses the search results and displays the contents in the format particular to the query type initially invoked. Communicating existing and future onboard smartphone sensor data (e.g. noise/light levels) to the server will adhere to OGC Sensor Web Enablement (SWE) standard encodings for measured sensor observations (O&M) and, where appropriate, various web-services (e.g. SOS, SAS, SPS) for providing access to sensor descriptions (encoded in SensorML) and real-time alerting and tasking of sensors or sensor systems.

Expected Impact

3DQ will contribute to existing, but static, noise pollution maps by including a dynamic data feed to complete the data gaps and improve the accuracy of noise maps already produced by Dublin City under EU Directive 2002/49/EC. As part of its commitment under the Dublin Agglomeration Action Plan relating to the Assessment and Management of Environmental Noise, Dublin City Council (DCC) commenced the installation of a permanent (static) ambient sound monitoring network in 2009. The purpose of this network is to measure outdoor ambient sound levels in the City at 10 representative sites of typical sound levels to which the citizen is being exposed (Figure 2). The data is also being compared with computer modelled noise maps in order to ascertain whether they provide a true representation of sound levels throughout the City. The goal is to identify areas in the city that exceed the night time level of 55 dB and day time level of 70 dB and bring them closer to the desirable levels of 50db night time and 55 dB day time in line with The World Health Organization Night Noise Guidelines (NNGL) for Europe. Considering that there are only 10 noise monitoring stations currently installed in the city, the dynamic nature of the proposed mobile 3DQ data streams into the modelling algorithms would greatly improve the effectiveness of the measures taken to ensure that noise pollution is monitored accurately throughout the cityscape. In addition, we will employ transforming cartogram (mapmorphing) techniques - where the delivery of geographic information describing various social or environmental scenarios can be effectively illustrated by warping maps based around population densities, noise levels, pollution levels, or other themes – to clearly illustrate the challenges with living in the modern world.
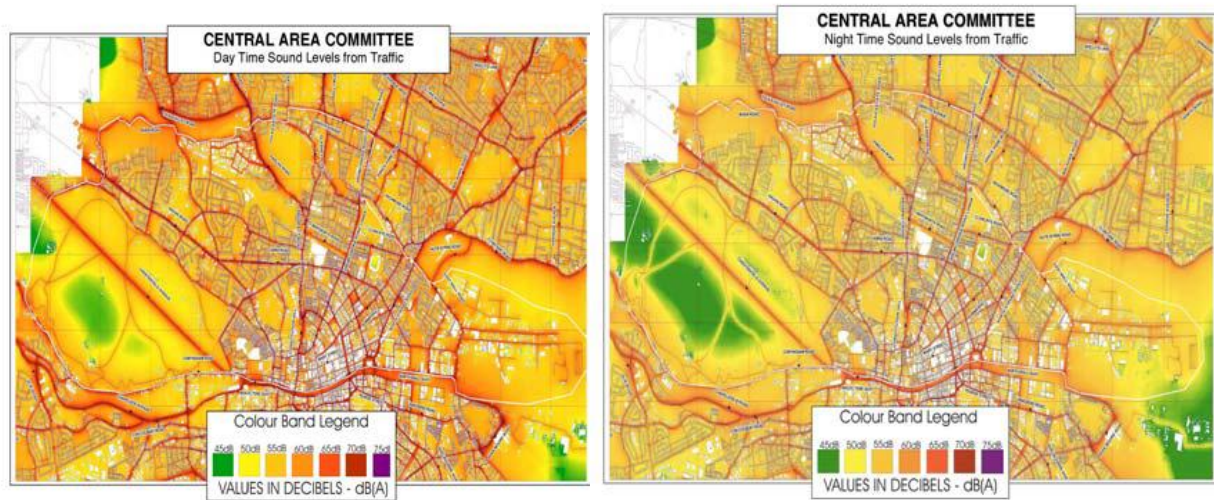
Figure 2: Day and night maps of Dublin city centre

Involved Constituency

The 3DQ project is led by DIT and is part of the larger Smart Cities research challenge within the so called strategic research cluster StratAG (Strategic Research in Advanced GeoTechnologies) funded by Science Foundation Ireland (SFI). StratAG is comprised of 4 Irish universities (NUIM-NCG,EE,CS, TCDCS, UCD-CS, DIT-DMC), 4 industrial partners, and 5 government agencies. The Smart Cities research challenge in particular is supported by IBMs newly established Smarter Cities Technology Centre in Ireland together with Dublin City Council support for using the City as a testbed and piloting place for innovations that have commercial potential.

4.10.   Malta

4.10.1. DINOS

Overall Scope

Key Information

Full Name: Digital Information Navigation and Orientation System

Runs from: Feb. 2011 – Feb. 2013 (24 months)

Website(s): http://results2010.galileo-masters.eu/?startpage=65, http://tr-associates.webs.com, http://www.youtube.com/watch?v=j8-s285QWTE

Summary

DINOS for Smart Cities is a hybrid system, developed on Android mobile platform, which collects and manages information and aid users while travelling in a city by making use of localisation services. It incorporates an intelligent information system managing the status of the queues at the attractions automatically and thus distributing visitors among different attractions. The system is able to decide which queue is most flowing. Using Artificial Intelligence (AI) techniques, DINOS in return suggests attractions to the users depending on this status and provide recommendations based on the proximity of the user to the relevant attractions. Natural Language processing (NLP) is employed to protect the tourists since by reducing their use of the traditional methods. The system is composed of a central server receiving information from nodes in attractions and interacting with users on their mobile device. These recommendations are brought together through linked data on web sources.

Objectives

— To bring the web to the hands of the end users while exploiting the advantages of Web 2.0 and resultant social networks as a source of data and the Semantic Web to collect and manage this data to provide personalised recommendations.

— To link us with the end user communities and testing the service in different innovation ecosystem environments, which are using actively the mobile technologies in tourism and city marketing and to highlight points of interest in cities in Europe and/or outside

— To link the user communities and Android software developers for the further automated guide feature development and usage and requiring the creativity.

Highlights

DINOS is an automated guide requiring the least of user intervention. It provides the user with navigational and orientation support while travelling in a city while providing the user with up to date and personalised information after processing the social web and the semantic web. DINOS constantly monitors the location of the user, recommending attractions and places of interest in close proximity and according to relevance and profile of the user. Users can use the provided orientation tools which are namely an interactive map and augmented reality. This system makes use of GPS for external localisation. The application is developed on Android mobile technology platform.

R&D Scope

DINOS is an example to demonstrate how the satellite infrastructure and navigation communication technology can serve the development/testing/ deployment of a new product and service in the digital media and urban computing. This system exploits the advantages of Web 2.0 and resultant social networks

as a source of data and the Semantic Web to collect and manage this data to provide personalised recommendations. By clustering profiles and categorising the web source, the system profiles the users and adds value to the recommendation by using linked data. Besides, the system also employs purely technical innovations including wireless data transfer with aspects of functionality, security and privacy, 3D technologies, artificial intelligence and the virtual and embedded reality. It can be presented in any public spaces as part of the public services, where the WMS technologies covering and supporting the data transfer and the necessary communication infrastructure.

Expected Impact

1) Tourism: The system provides the possibility to get information about the attractions in the cities and a general orientation with the help of the combination of digital maps/guidebooks.

2) Marketing: The commercial community and historical attractions will use this system to promote their product and service while collaborating together to improve the experience of the user in the city where the system is being implemented.

3) Learning/Gaming: One could use the system as well for conducting learning experiences around the city such as scavenger hunts. In this way the user would learn through gaming.

The end user benefits from continuous adaptive guidance and navigational assistance while receiving quality and relevant information. Nonetheless, DINOS is also an accessible marketing and advertising space for commercial and historic entities. This is also a benefit for the marketing agencies which are provided with a new space and market where to practice highly segmented and dedicated marketing. In a nutshell, the users of DINOS are all entities who are related to the city in anyway. Another advantage would be that the application would have built a profile of the user and could process information in a way which guides consumers to the companies supporting this application.

Involved Constituency

DINOS is developed by a team of local stakeholders (Valletta Local Council, 1 SME, Living Lab Malta, Cisco Malta, University of Malta) with the aim to localize, manage and evaluate several trials in the different selected locations (within and outside of Malta as well) and its real environments and contents in order to set-up a commercially available product by the real interest of the cities. Future plan: We are also interested for some mobile operators or mobile producers (Motorola, NOKIA, LG, Samsung etc.) to build up a common business model to sell the product (per users or per corporate price or per franchise).

The target group is composed by individual users but also the commercial community, who would profit from the system since they will be more accessible for the potential clients. The system optimise the information flow from the city to the tourists to businesses and back.(B2B and B2C) and also the social network development of the user groups and Android developers.

4.11. Lithuania

4.11.1. RAIN

Overall Scope

Project "Development of Rural Area Information Technology Network RAIN" (thereinafter RAIN project) aims at helping to eliminate e-divide of broadband infrastructure between cities and rural regions, increase social cohesion and contribute to economic growth. Broadband communications infrastructure will be developed in all rural areas of Lithuania which are currently not served and where there are no plans for coverage in the near future.

The project consists of two layers: the first layer is dedicated to tender out the construction of passive network infrastructure (works, ducts, fibers) to construction companies. The second layer – management of constructed infrastructure and offering wholesale services to ISPs who in turn will provide retail services to end users at conditions and prices similar to urban areas.

Planned activities:

— Design and construction of optical fibre lines (5100 km) to 770 residential areas which will connect about 2000 existing infrastructure and other objects;

— Design and construction of connection points for towers and other existing infrastructure objects (2000);

— Installation of appr. 520 network nodes;

— Design and installation of network and service management systems.

These activities should increase broadband coverage to 98% of territory of Lithuania.

R&D Scope

Infrastructure/service management model:

1. RAIN network will be owned by the State. Ministry of Transport and Communications – owns, settles services and tariffs.

2. Public institution "Placiajuostis internetas " – non-profit supervisor of RAIN network established by the State for this purpose.

3. Maintenance of RAIN network is executed by private sector entities selected by open tenders.

4. Users of RAIN network – all retail operators (on equal conditions, i.e. without any restrictions and tenders).

5. End users – choose retail operator, services and last mile technology according to their needs.

6. The planned last date until which aid may be granted for RAIN project is 2014.

Expected Impact

The infrastructure being constructed must encourage the existing or new telecommunications operators to provide broadband services to end users. It is intended that implementation of this project will attract private capital investments to the access infrastructure of rural areas and will promote competition. The infrastructure created by RAIN project will enable telecommunications operators to provide broadband services and allow users to freely choose the service provider in at least 98 percent of the territory of rural areas.

Benefits for the target groups:

Public organisations:

— Information technologies are used to improve the entity's operations;

— Professional development of staff and opportunities for self-education;

— Closer co-operation between the population and government institutions;

— Savings on time and travel costs;

— Staff abilities are developed.

Business entities:

— More favourable conditions for co-operation with customers, partners and entrepreneurs;

— Information technologies are used to improve the entity's operations;

— Favourable conditions for business development;

— Staff abilities are developed;

— Conditions for developing and implementing projects;

— Opportunities for more successful and broader co-operation and competition;

— Directing the power of information technologies towards operational improvement and development;

— Opportunities for more successful development of competitive activities.

Inhabitants:

⎯ Knowledge development is encouraged;

⎯ Opportunities for substantial improvement to the living conditions and activities;

⎯ Strengthening of the social security, health security, cultural life and public administration position;

⎯ Savings on time and travel costs;

⎯ Availability of e-government services;

⎯ Closer co-operation with self-government institutions;

⎯ Development and implementation of projects.

Involved constituency

The ultimate objective of the State funding is to provide necessary broadband infrastructure and a wholesale service that enables retail broadband services to residential users, public institutions and businesses at conditions which are currently not available in the target areas.

End users:

⎯ Public organizations (libraries, forestry institutions, culture houses, health care institutions, teaching establishments, museums, post offices, religious organisations, social security institutions, public order institutions, Internet access points, land management institutions. Public organizations total 10,684);

⎯ Business entities (nearly 2,000 business entities which need access to broadband Internet to continue successful business);

⎯ Inhabitants (around 33% of total population lives in the countryside. Rural population totals 1,13 million. This population group also includes rural communities, which contribute pro-actively to satisfying the public needs of residents, addressing social issues and promoting public activity).

4.12.   Luxembourg

4.12.1. IPv6 Council

Overall Scope

Most of today's Internet and our corporate networks use IPv4, which is now more than three decades old. IPv4 has been remarkably resilient in spite of its age. In the early seventies, when IPv4 was originally developed, the current size of the Internet was beyond imagination. It is remarkable that this protocol is still able to be the transport for the Internet. But it has been hitting its limits for some time. The most obvious limitation is the address space, which is short and will run out in the near future. We have helped ourselves by using IP address sharing techniques such as NAT (Network Address Translation), but this is not a good long-term solution. By using the IPv6 address space of 128 bits (compared to 32 bits with IPv4), the limit on addresses has been extended from a theoretical 4 billion to 340 billion billion billion billion (3.4 x 10^{38}) — 2^{32} compared to 2^{128}).

But limited address space is not the only reason to move toward IPv6. The designers of IPv6 have learned from many years of using IPv4. They kept all the strengths of IPv4 and added a lot of functionality which will be needed in our future networks. In particular, the advanced auto-configuration features will allow businesses to deploy a great variety of new mobile, embedded network devices, RFID and sensors in a cost-effective, controlled manner. Interesting Mobility Enhancements will provide the foundation for new types of services now being developed.

IPv6 also adds many improvements to IPv4 in areas such as the security, mobility, quality of service, and scalability of the network architecture. IPv6 is therefore particularly suited for scalable and converged networks. A number of transition and coexistence mechanisms have been developed and are constantly improved in order to make the transition a smooth one. It is expected that IPv6 will gradually replace IPv4 over the coming years, with the two protocols coexisting for many years during a transition period.

Why the Luxembourg IPv6 Council?

Growth and innovation on the Internet depends on the continued availability of IP address space. The remaining pool of unallocated IPv4 address space is likely to be fully allocated within two to three years since only 560 million IP addresses, or 13% of the total space, are left to play with. IPv6 provides the necessary address space for future growth. We therefore need to facilitate the wider deployment of IPv6 addresses. While the existing IPv4 Internet will continue to function as it currently does, the deployment of IPv6 is necessary for the development of future IP networks.

The Luxembourg IPv6 Council has been established to support a smooth transition to IPv6 by consulting and advising all stakeholders with recommendations and roadmaps. This council will be made up of

experts from industry, research, politics and administration in the IPv6 field with the clear mission to advocate IPv6 by improving technology, market, and deployment user and industry awareness of IPv6, creating a high-quality and secure new-generation Internet.

R&D Scope

The main scientific and technological scope of the initiative/activities are those of the FP7-ICT research areas contributing the Future Internet Assembly:

— Network Architecture

— Service Architecture

— Future Content Networks

— Internet of "Things"

— Trust, Security, Privacy, Identity

— Future Internet Research and Experimentation

Expected impact

The first focus is on the deployment of IPv6 in Luxembourg using the IPv6 Roadmap outlined in this document.

Involved constituency

The first meeting was initiated by the Minister of Communication gathered 120 stakeholders from industry, the banking sector, academia, government and research to discuss the Future trends of the Internet.

4.13. The Netherlands

4.13.1. Internet Economy: Discussion Paper

Overall Scope

The Dutch Ministry of Economic Affairs asked RAND Europe to explore the critical issues arising from the emerging Internet economy. It resulted in "The Future of the Internet Economy; a Discussion Paper on Critical Issues".

The document provides a basis for a continuous exchange of ideas relevant for current and future policy making in response to the challenges posed by the emerging Internet economy. It addresses emerging trends and underlying values and the possible role of governments in dealing with the unfolding Internet economy.

No specific actions are being taken in the field of the internet which can or will contribute to address the problems associated with the current economic crisis and prepare the ground for a recovery through innovation. The further development, roll out and take up of internet is carefully monitored in general, as the Internet is seen by Dutch government as a crucial driver of sustainable economic growth and innovation)and – by implication - Economic recovery.

R&D Scope

Trends that have been identified as relevant for further research:

Globalisation trends:

— Universal connectivity and access,

— the cost and benefits of diversity

People trends:

— Being led by our kids

— the empowerment of the individual

Technology trends:

— a new era of pervasive computing creating intelligent environments

Security trends:

— Accepting risks,

— Increasing transparency

— Taking precautions as in the physical world

Economic trends:

— Balancing collaboration and competition,

— Balancing stability and innovation.

(Internet) Governance trends:

— Accepting the global, multi facetted nature of the Internet

— Dealing with failing jurisdictions and poor enforcement

Main messages from discussion paper mentioned above:

— Infrastructure: Facilitate the convergence of networks and devices, applications and services.

— Socio-economic dimension: Fostering creativity in the way we connect, work, make money and live.

— Reliable use and common Trust: strengthening confidence and security

— Internet Governance: ensure that the Internet economy is truly global

Expected impact

The future of internet is not as much concerned with strengthening of the ICT industry – there are other, more short term and here-and-now oriented policy-lines for that. The expected impact wil be that the transformation of the Dutch and European economy in the direction of the Lisbon goals (information society / knowledge economy) and the transformation of economic sectors with the application of the internet of things and trans-sector innovation.

Involved constituency

— Michel van Eeten Delft University of Technology

— Olaf Kolkman NLnet Labs

— Dr Natali Helberger University of Amsterdam / Institute of Information Law

— Jaap van Till Stratix Consulting B.V

— Michiel Westerman Pink Roccade

— Roelof Meijer SIDN

- Rudolf van der Berg LogicaCMG

- Professor Jonathan Cave Warwick University, RAND Europe

- Marco Plas Cap Gemini and Jericho Project Research Group

- Olaf Kolkman NLnet Labs

- Martin Cave Warwick University

- Paul van Binst Universitee Libre de Bruxelles

- Bart Schermer ECP.nl and RFID-platform

- Jens Arnbak Delft University of Technology

- William Drake Project on the Information Revolution and Global Governance, Development Studies

- Jeanette Hoffman, London School of Economics

- Humboldt University

- Eric Huizer NOB

- Jeanne Misfud-Bonnici Groningen University

- Jaap van Till Stratix Consulting B.V.

- Jonathan Cave Warwick University, RAND

- Chris Marsden University of Essex

- Informal support group of the Ministry

- Erwin Bleumink Surfnet

- Olaf Kolkman NLnet Labs

- Eric Huizer NOB

- Roelof Meijer SIDN

Received additional contributions from:

- Nico Baken Delft University of Technology

- Leo Koolen European Commission

- Mike Nelson IBM/ISOC

- Vint Cerf Google

- Patrik Fältström Cisco

4.13.2. NDIX

Overall Scope

Key Information

Runs from: Feb. 2001 – ongoing (ongoing)

Website(s): www.ndix.net

Summary

NDIX is a unique open platform to facilitate competition, innovation and the development of new digital services by offering unlimited and secure connectivity between suppliers/developers and (potential) users of services.

NDIX is the prototype open digital marketplace. It interconnects FTTH and FTTB/I infrastructures and allows companies, institutes and households to connect over 1 fiber-access to any number of different suppliers of all kinds of electronic services simultaneously from all over the Netherlands and Germany (Nordrhein Westfalen) based on a flat-fee.

As a result, NDIX:

— boosts the competition between suppliers of existing services (like Internet, telephony and hosting/backup),

— facilitates the development of new services (for learning, security, healthcare, public services, in the cultural, social, entertainment and creative sectors),

— facilitates the innovation related to the introduction and use of new services, and

— promotes the investments in new fibre infrastructures.

Objectives

— Offer flexible and concurrent use of as many as possible different services and their suppliers over 1 fibre access.

— Create of a critical mass of (potential) users for new service development

— Stimulate innovation

Highlights

The project is innovative in the following aspects:

— Use of Technology: Ethernet connectivity on a large scale (Netherlands and Germany (Nordrhein Westfalen), with PoPs in more than 35 cities in the two countries.

⸻ More than 100 suppliers of services spread in the Netherlands and Germany use this platform to deliver their services to more than 1200 business-users and households. In average each customer uses services from 2 to 3 different suppliers simultaneously.

⸻ Investments in new services to the amount of 30.000.000 euro have been made. Investments in more than 20 different fibre-access networks have been made of more than 20.000.000 Euro.

⸻ Cross domain, cross region and cross border delivery and use of services is optimized by removing technical, financial and marketing borders.

⸻ Pilots projects for the development, introduction and use of new services have started.

⸻ The project results include the lowest price for fibre based access for businesses , public organisations and households in its working-area, together with an abundant availability of services against competitive prices.

⸻ The project is supported by more than 20 public authorities.

R&D Scope

The project stimulates the development, introduction and use of all types of electronic services. Internet is the most commonly used service that is offered on this digital marketplace. Due to the large number of competing suppliers, and the low price for access to these suppliers, the use of Internet by customers connected to this marketplace has increased more than the use of internet in general.

Moreover, the digital marketplace stimulates and takes down existing barriers for the development, introduction and use off all kinds of new digital/electronic services, both IP-based and Ethernet-based.

Such Ethernet-based services (e.g. in healthcare, security, public services, home-offices) are a driver for the further development of IP w.r.t. quality and security aspects.

Where Internet Exchanges, as marketplaces for IP, have been and are one of the success factors behind the enormous development of the Internet, NDIX, as a similar digital marketplace for Ethernet (VLANs), proofs to have a similar effect on the development and use of new services. The technology is similar, the business model differs.

Expected Impact

The project improves the regional development by access to services for all, and likewise, access for service providers to (potential) customers. It stimulates the investments in regional and local fibre infrastructures. One open market on a large scale stimulates the economic and social development of the regions where its active.

<u>**Involved Constituency**</u>

Public shareholders have full control over this digital marketplace, assuring its neutral and non-profit status. These in turn form, just as for Internet Exchanges, the basis to perform as a real open digital marketplace.

This platform serves 4 stakeholders:

— Service providers offer their service in a competing and fast growing market. Especially small providers (start-ups) are provided with access to a large number of (potential) customers , thereby maximizing the possibilities they have to develop and successfully exploit new services.

— Customers (business, public and households) can freely choose from these services.

— Parties that invest in fibre infrastructures provide an added value for their customers by the abundant availability of both suppliers and users available over this marketplace. If fibres lead to this marketplace, the number of new customers for the fibre infrastructures, and thereby the successful exploitation of the large investments in these infrastructures, are increased significantly.

— Public authorities improve the development of their region by supporting the development in their region of a cross-region and cross border digital marketplace.

In the pilot- and development projects, research institutes (universities, TNO, NOVAY, Saxion), service suppliers and actors in the different economic and social sectors are cooperating on the development and use of new services.

4.13.3. Surfconext

<u>**Overall Scope**</u>

Key Information

Runs from: Jan. 2010 – Jan. 2011 (12 months)

Website(s): http://www.surfnet.nl/en/Thema/coin

Summary

Currently, the market offers a great variety of online applications. The number of available online applications increases at a fast pace, they evolve quickly and tend to become more complex and specialized. At the same time users become more demanding and want to choose, mix and match tools from different vendors that best fit their online collaboration needs. The downside of this multi vendor approach is that users need to authenticate for each tool separately and that there is a lack of interoperability.

To simplify identity management and to improve the interoperability of online applications, SURFnet and partners in higher education and research created a next generation collaboration infrastructure entitled SURFconext. The use of open standards like OpenSocial and SAML play a central role in SURFconext. SURFconext is a synergy of identity management, social networking and collaboration applications.

Objectives

1) provide a next generation collaboration infrastructure to better facilitate online collaboration and to create new opportunities for multidisciplinary collaboration efforts in education and research both national and international.

2) interlink (new/innovative) services from different providers and to offer these services via the SURFconext infrastructure.

3) enhance the adoption of open standards in online collaboration (see the chapter on technology), to minimize vendor lock-in and to increase reuse of middleware components.

Highlights

The unique selling point of SURFconext is the availability of a rich set of collaboration services from which our users (e.g. students, researchers an teachers) can choose to fulfil their online collaboration needs. SURFconext will remove the thresholds for online collaboration and creates new opportunities for collaboration between multidisciplinary teams.

A unique feature in SURFconext is SURFteams. SURFteams is a supporting service for the administration of group relationships. Multiple collaboration services can use the SURFteams database to determine which users are authorized to access resources. This way, the membership roster remains consistent across applications and context awareness can be created.

SURFconext is designed for reuse, minimises vendor-lock-in by interconnecting products from different vendors and it pushes open standards. The open standards SAML (security assertion markup language for identity management) and OpenSocial (as a generic integration standard and specification) play a central role in this project. Both standards have already been adopted by the international community and have a substantial user base. As such SAML and OpenSocial hold great promise for interconnecting researchers, educators and students.

Pilot studies have been implemented with products from several vendors like Alfresco, Liferay, Atlassian and Cisco. Even not for profit initiatives and collaboration services are involved, like Sakai (in partnership with the University of Amsterdam), MyExperiment, Foodle, Filesender and Etherpad. In the end, SURFconext will accelerate the development of social features in eReseach and eEducation applications, reduce the digital divide.

R&D Scope

One of the primary aims of SURFconext is to stimulate the use of open standards. Standards that are used in SURFconext are SAML and OpenSocial:

SAML

SAML is an XML-based standard for exchanging authentication and authorization data between security domains, that is, between an identity provider (a producer of assertions) and a service provider (a consumer of assertions). The single most important problem that SAML is trying to solve is the Web Browser Single Sign-On (SSO) problem. SAML and its implementation in the SURFnet service SURFfederatie is an important requirement for online collaboration in SURFconext. The use of the SAML standard in SURFconext enables users in education and research to access a rich and still growing set of applications with their own institutional account.

OpenSocial

Research and education are inherently social activities and therefore require standards that facilitate social networking. OpenSocial helps software providers to better model relationships between people by providing social APIs for the exchange of profile, friend, group and activity data. In addition, OpenSocial provides a gadget architecture. Gadgets are small, pluggable "mini-applications" that are easy to install in any Web page and reusable in any OpenSocial environment. A well-known instance of OpenSocial is iGoogle. SURFconext provides an iGoogle like portal but in contrast to iGoogle it provides additional features like single sign on and group context awareness all in a safe oAuth enabled `environment.

The standards above have been implemented in 2010. Other standards and protocols will be explored in 2011. For example, SURFnet will investigate the suitability of data exchange standards like CMIS - Content Management Interoperability Services -, IMS/LTI - a standard to improve interoperability between learning tools – and XMPP an open technology for real-time communication (e.g. video calls, chat and instant messaging).

Expected Impact

By facilitating online collaboration in the field of education and research, SURFconext ensures that researchers, teachers, and students can collaborate online in a simple and very effective way. By using the internet, collaboration is possible across institutional and country boundaries. Having a healthy research and education industry, is a significant requirement for a competitive knowledge economy.

By using open standards and by open sourcing of our products, universal usability and reuse of the SURFconext infrastructure will be guaranteed.

Involved Constituency

The success of SURFconext depends on the adoption of this technology and architecture by institutions (universities/research), virtual organizations (e.g. CLARIN and LIFEWATCH) and service providers. That is why SURFnet institutions have been involved in this project from the very beginning. With other words, SURFconext has been developed by and for higher education and research. Partnerships have been established with national and international Research and Education Networks (NRENs) like Uninett in Norway, Internet2 (US) and Terena (EU). These NRENs provided reusable components and gave feedback on the SURFconext architecture. In addition, SURFnet actively participates in the OpenSocial foundation. SURFnet and the OpenSocial Foundation organized the first OpenSocial event in Europe.

4.14. Poland

4.14.1. *Future Internet Engineering*

Overall Scope

Key Information

Runs from: Jan. 2010 – Jan. 2013 (36 months)

Website: www.iip.net.pl

Summary

The project "Future Internet Engineering" is the strategic polish research project aimed at improving capabilities of the current Internet by proposing more efficient network infrastructure and new set of applications. The project activities are grouped in four main work packages that correspond to: (1) transformation of the current IPv4 network into IPv6, (2) designing, prototyping and testing of the system for Future Internet that is based on novel architecture exploring the concept of virtualization, (3) designing, prototyping and testing selected advanced applications, and (4) designing and building national research network for supporting experimentally driven research in the area of Future Internet, named PL-LAB. The project collects more than 120 researchers from 9 top organizations (research centers and academia) in Poland working in the area of ICT.

Objectives

— To research on Future Internet by defining novel architecture and to design, prototype and test (in developed by project national research laboratory) new system supporting 3 Parallel Internets each based on different data and control planes, among them two are post-IP proposals

— To develop enhanced applications for e-health, home networks, car networks and to test them in designed Future Internet system

— To accelerate transformation process from IPv4 into IPv6 in Poland

Highlights

Activity 1: World of IPv6

This activity concentrates on supporting faster transformation from IPv4 into IPv6. In particular, we focus on: provide new user-friendly IPv6 functionalities to existing network, services and applications including virtualization of resources. The validation and testing process is made in national scale of IPv6 testbed. Separate track of IPv6 activity is focused on development tools and provide support for migration from IPv4 to IPv6. The advanced tools for automatic migration support and validation is requested by community of SME and ISP (e.g. Migration Guide or LiveCD tools). The development of dedicated new IPTV or VoIP application using of IPv6 features is included in this activity also.

Activity 2: Designing, prototyping and testing of the system for Future Internet

A novel architecture for Future Internet is proposed that consists 6 levels: physical infrastructure level consisting of devices enabling virtualization and links, virtualization level, Parallel Internets level, virtual netwrk level, application/services level and user level. On the basis of this architecture, we design the IIP System to show that we can significantly extend the capabilities of network infrastructure in providing more effective data transfer comparing to this offered by current TCP/IP-based Internet. New capabilities in our system mainly correspond to possibilities of supporting: (i)a number of Parallel Internets that share common physical network infrastructure, (ii)specific data and control planes for each Parallel Internet. More specifically, we define three different Parallel Internets and they are: (i) IPv6 QoS DiffServ offering a number of Classes of Services, Content Aware Network and Circuit Switched like for handling producing constant bit rate and requiring low losses and delay. For these Parallel Internets we design virtual nodes and links using devices enabling virtualization as EZappliance, NetFPGA and XEN.

The IIP System has wired and wireless parts. For wired part, we use new generation fibre–optic solutions while wireless part is based on 802.11 and 802.11s. Furthermore, the IIP system has novel management system with the levels following the mentioned architecture. Moreover some mechanisms the security at the level 2 are implemented that assure the system against attacks and provide assessment of trustiness.

Activity 3: Designing, prototyping and testing selected applications for Future Internet

The set of applications under development represents a multidisciplinary and integrated approach to handle and deliver various types of content. The applications have been selected to be demonstrative for various classes of traffic requiring extended capabilities of IIP System.

We design new applications (15 applications with various scenarion) corresponding to the following areas:

— home networks (Applications addressed various aspects of so-called Internet of Things. The set of applications contains: HomeNetMedia to provide access to digital multimedia content in home environment, MobiWatch to assure security with home video surveillance systems and HomeNetEnergy to monitor and control energy consumption through smart home devices management),

— e-health (Applications composed of modules allowing collecting, storing, sharing and processing data for remote patients monitoring, diagnosis and therapy purposes. The set of applications contains the following: Universal Communication Platform for Wireless Networks, System For Asthma Therapy Support, SmartFit to support sportsman's training, eDiab to monitor diagnose and support therapy of diabetes and Private Family eHealth Network.

— e-learning (Applications devoted to utilize and demonstrate various content and context aware content delivery in e-learning systems. The set of applications contains the following: E-learning assessment system. HD videoconferencing system for e-learning applications and Virtual Laboratory with content delivery system.

— content delivery (Applications related to interactive nature of the networked services, popularity of novel input devices, introducing content awareness networks, all provide the basis for the 3D Internet develop and enabling creation Virtual Worlds. The set of applications contains: high quality teleconferences services and virtual museum based on streaming and storage systems for new media like very high resolutions video.

Activity 4: Designing and building national test-bed PL-LAB for testing solutions for Future Internet

The objective of this activity covers design and deployment of a national research infrastructure, named PL-LAB. This infrastructure comprises of research and operational parts, as well as, an access control system. The research part is distributed among 8 laboratory sites, which are interconnected with PIONIER network (Polish NREN) using gigabit links. The final element is the access control system allowing for remote creation and execution of experiments. The aim of the infrastructure is to test IIP System as well as to test other solutions proposed for Future Internet.

R&D Scope

For designing IIP System we use new generation network elements enabling us for creating virtual nodes and virtual links belonging to different Parallel Internets, as mentioned above to IPv6 QoS, Content Aware Network and Circuit Switched like network. The IIP system will be innovative in that sense that we have

three different Internets using the same physical infrastructure. To this system we can add new Internets (with different protocol stack) if needed.

The proposed solutions in the area of IPv6 world are joining virtualization with IPv6 technology and offering new quality of services and applications. All scientific research results are verifying by prototyping on software and testing it in national scale testbed. The end user is supported by rich portfolio of tools where in automated tests and context helping system user friendly approach is delivered.

Expected Impact

The Future Internet Engineering project is agree with EU policy regarding the development of Future Internet and offering the results for researchers and wide community of end users in Poland. The open access to results of the project allows to decrease existing Digital Divide between regions in Poland and increase role of Polish achievements in European Research Area (ERA). The architectures and technologies developed in FIE are applicable to almost all similar national infrastructures of European countries. The proposed solution eliminate the gap between theoretical research and experimentations (including service and application development).

All activities to widely disseminate the knowledge and capabilities of the project are reported in national and European scale (e.g. during FIRE and FIA workshops). In addition, the project prepares the courses for students from Technical Universities.

Involved Constituency

The project involves researchers from 19 leading teams (from 9 leading research organizations and academia in Poland) working on ICT systems. In total, we have more than 120 researchers, including 30 PhD students.

The consortium:

— Warsaw University of Technology (Politechnika Warszawska) – coordinator, Warsaw

— National Institute of Telecommunications (Instytut Łączności – Państwowy Instytut Badawczy), Warsaw

— Wrocław University of Technology (Politechnika Wrocławska), Wroclaw

— Poznan University of Technology (Politechnika Poznańska), Poznan

— PSNC – Poznan Supercomputing and Networking Center (Instytut Chemii Bioorganicznej PAN – Poznańskie Centrum Superkomputerowo Sieciowe)

— Instytut Informatyki Teoretycznej i Stosowanej PAN, Poznan

— Silesian University of Technology (Politechnika Śląska), Gliwice

— Gdansk University of Technology (Politechnika Gdańska), Gdansk

— AGH – University of Science and Technology (Akademia Górniczo-Hutnicza im. Stanisława Staszica w Krakowie), Cracow

4.14.2. Ego: Virtual Identity

Overall Scope

One of the most important factors that will enable shift to the Future Internet, as it is believed it should look like, is a revolution in means of communication with one another via the Internet. Emerging services are expected to accelerate a transfer of increasing number of real-world activities to the Web. It is crucial for users to facilitate understanding of their needs by aforementioned services and content providers. This will enable full utilization of opportunities, that will be provided by the Future Internet with regard to access to information.

Ego project, financed by the Polish Ministry of Science and Higher Education, aims to enable people to semi-automatically create their representations, called virtual identities, to manifest their information needs in various Web sources. Project goal is also to enable Web sources to agilely adapt to users' expectations. Fulfilment of this goal will enable better understanding of users' needs by information sources and services to enhance customisation and flow of information in the Web.

R&D Scope

The project integrates achievements from the fields of user modelling and identity management. The virtual identity is going to be an evolving, complex user model. Software components will collect information about user's actions, infer his/her interests and needs and finally update a virtual identity to ensure, that it reflects user's needs as closely as possible. Thus created user's virtual identity will be presented to compliant information sources and services to enable a better understanding of user's needs. It is worth mentioning that the user will be able to restrict amount and type of information presented to a particular services or sources.

In particular, research challenges are:

— Acquisition and integration of information concerning activities of Internet users to build their virtual identities

— Creation of methods for data analysis to acquire information about users' information needs will utilize Artificial Intelligence techniques

— Combining achievements from the field of user modelling and identity management to create protocols to manage users' representations in heterogeneous IT systems environment.

— Planned work on use case development will utilize information filtering techniques.

Expected Impact

A significant impact of the project is expected, bringing advantages for Internet users as well as service and content providers.

For end-users:

— Facilities in information retrieval and filtering will ease and accelerate information acquisition processes. Content and services will be better aligned to user needs and users will be provided with more relevant information. Moreover, duration of content adaptation process will be much shortened.

— User's virtual identity lifecycle scheme will be proposed enabling automatic creation and evolution of users' representations in the Web.

— Discovery of users' identity evolution patterns will aid users in development of their knowledge and broadening their interest areas.

For content and service providers:

— Possibility of an immediate personalisation thanks to upfront knowledge on a user's profile will help content providers to meet their users' expectations.

— Knowledge on users' information needs and identities evolution patterns can help content or service providers to decide what a desirable improvements of provided services or contents are.

Involved Constituency

Established in 1926, Poznan University of Economics (PUE) is one of the oldest and most prestigious business universities in Poland. The university's main strengths are its educational experience, international relations, well-developed research base and its co-operation with business and industry. PUE has participated in a number of EU funded programmes, including e.g. SOCRATES/Erasmus, PHARE ACE, Leonardo da Vinci, and 5th, 6th and 7th FP projects e.g. PISTE, EURAREA, USE-ME.GOV, ASG, SUPER and Service Web 3.0.

Department of Information Systems carrying out tasks within the project belongs to the Faculty of Informatics and Electronic Economy, which is acknowledged as outstanding by the Accreditation Committee by Polish Ministry of Science and Higher Education. DIS conducts research in the area of: knowledge representation techniques, information extraction, information retrieval and filtering (with

emphasis put on personalization and contextualisation), extraction and integration of data from the deep Web, service orientation as well as profiling and estimation of quality parameters of software.

4.14.3. eXtraSpec

Overall Scope

Key Information

Full name: Advanced data extraction methods for the needs of expert search

Summary

The goal of the eXtraSpec project is to create a solution that analyzes internal documents of the organization and external Web sources in order to find an appropriate expert from the specific domain or who has specific competencies.

Project eXtraSpec is an innovative solution that identifies problems from HR domain. Project result might be used in a wide spectrum of organizations where appeared a need to find an expert with a particular skills. Our solution can be use in public institution as well as in enterprises. It is possible to search experts among employees (e.g. while composing a team for internal project) or while looking for a potential candidates. Project results will contribute to decreasing information asymmetry at labor-market and partially converting tacit knowledge into explicit and widely used knowledge.

R&D Scope

eXtraSpec features:

The sources of data for the system include company internal documents and the Internet sources. The project anticipates inter alia processing of low-structured documents. The project focuses on processing of texts written in the Polish language.

To obtain the missing data, the system is able to perform a targeted search in the Internet.

The application of the proposed extraction methods from unstructured texts is limited by the type of processed documents, their structure and content (e.g. blogs, CVs, public profiles on social portals, homepages, media references). The type of the documents being processed is defined on the basis of the realised extraction scenario.

The obtained information is stored in system in the form of people's profiles and may be consolidated when needed.

The system enables to query the database of profiles in order to find persons with specific characteristics. Though, the competencies are the most important criterion.

Expected Impact

Knowledge management in an organization is a key to its effectiveness. Proper recruitment of new employees as well as the optimal use of their skills and competencies are of major importance. The Internet is used in each and every area of everyday life and social portals are increasing on popularity.

The eXtraSpec project assumes that combination of both company internal electronic documents and information sources available in the Internet (e.g. job portals), provides a more effective way of searching for experts with competencies in a given field.

Involved Constituency

Established in 1926, Poznan University of Economics (PUE) is one of the oldest and most prestigious business universities in Poland. The university's main strengths are its educational experience, international relations, well-developed research base and its co-operation with business and industry. PUE has participated in a number of EU funded programmes, including e.g. SOCRATES/Erasmus, PHARE ACE, Leonardo da Vinci, and 5th, 6th and 7th FP projects e.g. PISTE, EURAREA, USE-ME.GOV, ASG, SUPER and Service Web 3.0.

Department of Information Systems carrying out tasks within the project belongs to the Faculty of Informatics and Electronic Economy, which is acknowledged as outstanding by the Accreditation Committee by Polish Ministry of Science and Higher Education. DIS conducts research in the area of: knowledge representation techniques, information extraction, information retrieval and filtering (with emphasis put on personalization and contextualisation), extraction and integration of data from the deep Web, service orientation as well as profiling and estimation of quality parameters of software.

4.14.4. NOR-STA

Overall Scope

Key Information

Full Name: Supporting processes of achieving and assessing conformance to NORms and STAndards

Runs from: Jan. 2010 – Jan. 2013 (36 months)

Website: http://www.nor-sta.eu/

Summary

The project aims at development and deployment of innovative services to support processes of achieving and assessing conformance to standards and norms. The services provide for representing and maintaining conformance arguments, integrating these arguments with the supporting evidence and assessing the compelling power of the arguments. All these services are accessible through standard Internet browsers

and their deployment is planned in accordance of the SaaS cloud computing model. The project integrates three main viewpoints on standards: owner, user and assessor. NOR-STA services support all three viewpoints and move the whole problem of conformance demonstration and assessment to the Internet in a way which respects security and privacy perspectives. The project runs a series of Case Studies with partners from medical and business sectors including hospital quality management and secure outsourcing management. Expansion to other sectors is foreseen in the project course. It is expected that the project will conclude with a spin-off company.

Objectives

— deployment of prototype services supporting application of standards

— validation of the services in cooperation with business partners

— development of a business model for introducing of the services to the market

Highlights

NOR-STA services are based on innovative use of internet technologies and redefine processes of achieving and assessing conformance to standards and other normative requirements. No similar solution exists yet in the market.

NOR-STA moves storing, building, reviewing and assessing conformance arguments and the supporting evidence entirely into the cyberspace. NOR-STA moves the traditional, paper-based evidence demonstrating conformance to the digital world and links these evidence with the argumentation structure in an explicit way. The range of evidence supported by NOR-STA covers all digital media, including images, documents, scans, movie or sound clips and so on. Maintaining all the conformance related argumentation and evidence in the cyberspace provides for unprecedented ease of use and business performance.

NOR-STA co-operates with the institutions covering all relevant viewpoints: standard owners (presently represented by Healthcare Quality Monitoring Centre in Krakow and International Outsourcing Institute in Elblag), standard users (numerous hospitals applying standards for hospital quality management and enterprises applying standards for secure outsourcing), conformance assessors (represented by Det Norske Veritas Poland). NOR-STA builds a community of partners from business, administration and industry by the NOR-STA Stakeholders Committee which provides a platform for communicating with the stakeholders, disseminating project results and acquiring partners for case studies.

NOR-STA follows the strategic EU priorities on regional, national and international levels. NOR-STA services promote quality and standardization which in turn increases business competitiveness as well as catalyze knowledge-based economy. Up to now, NOR-STA deployed its services in several pilot case studies carried out in cooperation with real users. Conformance arguments are being developed by several hospitals applying the healthcare quality management standard promoted by Polish Ministry of Health, and several enterprises are developing their conformance arguments applying the standard for secure

outsourcing management. A number of conformance argument templates have been developed for industry standards (e.g. ISO 27001, ISO 15408 Common Criteria) have been developed in cooperation with the partners of two EU 6th Framework Programme projects. New case studies in cooperation with public administration (Pomeranian Region Voivodeship) and one of the leading worldwide car manufacturers are under negotiations.

The innovative ideas, methodologies and tools of NOR-STA have been developed within the context of three EU-funded projects: 5th FR STREP project DRIVE, 6th FR Integrated project PIPS and 6th FR STREP project ANGEL. NOR-STA services are universally applicable to any standards and therefore they have very high potential for expanding to all sectors where standardisation is considered as a priority. By making the services accessible by means of the standard Internet browsers NOR-STA provides for their universal accessibility and by implementing them in the cloud provides for the use-as-needed model from the users' perspective. Embedding the services in a (private) cloud, carefully selecting the relevant technologies and design solutions and explicitly defining the NOR-STA security policies provides for building service level agreements (SLA) with the users which respect their expectations related to information and service security.

NOR-STA services include an innovative argument assessment mechanism and provide for communicating the strength of the conformance argument (using colours) which highly facilitates communication with decision makers without requiring them to go into technical details.

NOR-STA moves the processes of demonstrating and assessing conformance to the cyberspace. Digital evidence saves paper, printers and storage space. Remote access to NOR-STA services reduces the overall costs of achieving and assessing conformance, in particular the need of travels, which otherwise would add up to the increasing CO_2 emission. This way NOR-STA contributes to natural environment protection.

R&D Scope

NOR-STA services are implemented in a (private) cloud and offered to the users in accordance with the Software as a Service (SaaS) model, which currently becomes an emerging standard of providing IT services to customers/end users. The services are to be used on the as-needed basis without any prior significant investment which will make them affordable for the users with limited resources (e.g. SMEs).

The services are developed following the incremental and evolutionary process model with strong verification component (implemented by automated regression tests) and with primary focus on validation (implemented by interactions with users, common case studies and NOR-STA stakeholders Committee).

The main IT support in NOR-STA is based on RIA (Rich Internet Application), which enables advanced and ergonomic user interface delivered through ordinary web browser without a need of installing any additional software on the client side. NOR-STA services are implemented using modern technologies, in particular AJAX frameworks are based on FLOSS technologies (Java, JBoss, PostreSQL) which contributes to lower deployment costs and better maintainability.

NOR-STA services are implemented in the cloud computing service-oriented architecture. The technical implementation is advanced, but completely invisible to end-customers. By introducing VMware solutions (e.g. for virtualisation) NOR-STA offers high efficiency and scalability while reducing complexity. Data are protected by advanced data replication techniques and physical security. Service availability is permanently monitored with on-line tools.

To meet sophisticated security requirements related to conformance arguments (and in particular to the evidence) NOR-STA implements a role-based access control mechanisms which provide for controlled information sharing and protection.

<u>Expected Impact</u>

NOR-STA moves the conformance arguments and the supporting evidence to the cyberspace making them universally accessible and auditable to the users. This radically changes the nature of the conformance argument making it a living digital document accessible on-line to any authorized user. This provides for integration and aligning of the standardisation related processes with the business processes of enterprises and can have a very positive impact on making standard conformance an important leverage of better quality and performance of business. The case studies performed during the course of NOR-STA project in cooperation with stakeholders aim at identification of the business value resulting from such change. The results obtained so far (from the healthcare and outsourcing sectors) strongly support these expectations.

Improving the effectiveness and efficiency of the processes related to conformance achievement and assessment will have far reaching consequences positively affecting businesses, administration and citizens. This impact will be on regional and national levels. As NOR-STA services will also be offered in English, it is expected that the impact will be international.

NOR-STA services are unique internationally and therefore they have a good chance to take a considerable share of the market related to standardization support. They offer added value to all relevant perspectives: promotion of standards (owner's perspective), application of standards (user's perspective) and conformance assessment (certifier's perspective).

NOR-STA services are applicable to any standards, including international, EU, national and/or regional levels. They can be used by broad range of entities including industrial companies, SMEs, corporations, government and local administration and so on. As NOR-STA makes no assumptions about the norm/standard structure and contents, it can support application of a very broad range of standards across various sectors, industries and domains.

The experience gathered so far confirms that while applied in healthcare, NOR-STA facilitates achieving conformance, thus improving the quality of medical services for the citizens and hospital patients. Other case studies provided evidence that NOR-STA supports meeting regulations related to projects subjected to EC imposed regulations, helps in demonstrating quality requirements (e.g. related to safety, privacy and security) and provides means for monitoring environmental risk.

Involved Constituency

Presently NOR-STA has formal cooperation with partners including hospitals, the accreditation authority appointed by Polish Ministry of Health (for healthcare quality standards), NGO promoting outsourcing (and related standard on outsourcing security management), a leading certification company (Det Norske Veritas), regional administration authority and industrial partners. Negotiations with other partners are on their way. Present (formally approved by signing appropriate documents) partnership covers partners from all over Poland.

NOR-STA builds on many years of research and benefits from cooperation in EC funded research projects as well as bilateral cooperation with European partners. This includes participation in two 6th FP research projects (PIPS and ANGEL), applying NOR-STA services by another 6th FP project (DECOS) and using NOR-STA services by the Swiss based Health-On-the-Net foundation (HON). Former international cooperation resulted in frequent invitations of the NOR-STA team to participate in project proposals to 6th and 7th European Framework Programmes (one project proposal is presently waiting for evaluation).

The project constituency is expected to expand dynamically which will be facilitated by cooperation with standards owners (e.g. the Healthcare Quality Monitoring Centre in Krakow estimates that several hundreds of hospitals in Poland are prospective users of NOR-STA services).

4.14.5. PLATON

Overall Scope

Key Information

Full name: PLATON – Service Platform for e-Science

Runs from: July 2008 – August 2012 (49 months)

Website: www.platon.pionier.net.pl

Summary

The project focuses on development of e-Services for Polish scientific community based on the infrastructure of the national optical research and educational network PIONIER. The PIONIER network covers the whole territory of Poland and connects research entities and higher education establishments with the GEANT network and scientific networks of neighbouring countries. Basing on the infrastructure of the PIONIER network, the project PLATON develops e-Science services that will be accessible for all researchers from all over the Poland.

The main goal of the project is to implement 5 advanced s-Services: videoconference services, campus services, eduroam, archiving services and scientific HD TV services for educational and research purposes (e.g. visualisation for telemedicine, medical research and education).

The ICT services implemented due to the PLATON project can be characterised as follows:

1) Videoconference services: delivered by a high-quality and secure videoconference system that enables point-to-point connections, as well as connections between multiple locations simultaneously (also with the possibility to record and retrieve particular videoconferences.

2) Campus services: offered on the basis of national e-Infrastructure (including grids) that delivers applications on demand, capable of providing researchers with a flexible and scalable access to specific applications both in Microsoft and Linux systems (taking into consideration particular needs of professional groups like astrophysicists, physicists, biologists etc.).

3) Eduroam services: simple and secure roaming for researchers available at Polish academic and research institutions by launching model secure systems of access to the wireless networks

4) Archiving services: available at a national level, offer remote archiving and backup as a value added to the national academic and research PIONIER network. The archiving services will increase the real-time data protection.

5) Scientific HD TV: the national platform offering interactive scientific HD television based on high definition digital content for educational, research and practical purposes (e.g. telemedicine).

R&D Scope

See above.

PLATON project is mainly related to the implementation and development. However, due to its focus on providing research community with modern ICT services based on robust and advanced Internet infrastructure the project will facilitate research and interoperability of the national e-Infrastructure.

Expected Impact

The direct results of the project will be visible due to the implementation of 5 advanced services available for researchers: videoconference services, campus services, eduroam, archiving services and scientific HD TV services for educational and research purposes.

Moreover, due to its focus on providing research community with modern ICT services based on robust and advanced Internet infrastructure the project will facilitate research and interoperability of the national e-Infrastructure.

e-Infrastructure and e-Services resulting from PLATON will be used for future research and will contribute to the development of the information society.

Involved Constituency

PLATON involves 21 regional academic network operators (MANs) interconnected by the national research and academic network PIONIER.

Project partners – apart form the coordinator Poznan Supercomputing and Networking Center (PSNC) affiliated by the Institute of Bioorganic Chemistry of Polish Academy of Sciences – consist mostly of big technical universities in Poland, e.g.: Silesian University of Technology, Gdańsk University of Technology, Częstochowa University of Technology, Nicolaus Copernicus University in Torun and others.

4.14.6. *Semantic Monitoring of Cyberspace*

Overall Scope

Internet is evolving rapidly, being present in every aspect of our lives. Today's society except from using Internet for fun or work, has also to handle multiple cyber threats. The major objective of the SMC project is to integrate data from heterogeneous sources and enable for automatic detection of cyber threats. The project therefore faces the following challenges related to automated detection of Internet threats:

— handling large amount of structured and unstructured data,

— integrating data from diverse sources,

— evaluating if particular activity or data indicate a cyber threat.

Information from chosen Internet sources, like social network sites or on-line auction services, will be filtered applying a threat profile to find a particular threat. Experts' role will be limited to definition of the detection process and a profile of a cyber threat.

SMC aims to create a prototype enabling for monitoring of various Internet sources in order to detect cyber threats. Monitoring process should be executed automatically and result in a message about threats found.

SMC integrates expertise from areas of information retrieval, information extraction, information filtering and data mining. Results are to overcome problems with automatic monitoring of heterogeneous Internet sources, both deep and visible Web. Information from structured internal repositories will be integrated with information from chosen Web unstructured and structured sources. Since a profile of cyber threat is too complex to build it manually, experts will focus on definition of methods of construction of the profile. Then, using information from predefined sources, profile will be automatically developed and will evolve to follow changes of a potential threat. Therefore, threat profile as complex information filter can be used to detect cyber threats and the role of specialists is determined only to definition of monitoring process.

The main outcomes include:

— Identification of classes of threats. Construction of rules and methods for creation (and update) of a threat profile.

— Mechanism for monitoring of sources from the visible and hidden Web as well as integration of data from structured and unstructured sources.

— Demonstration of a working scenario for detecting cyber threats.

R&D Scope

SMC project is compliant with the 7. Framework Programme objectives, more specifically with the Security objective, as it addresses existing problems in the area of the Internet security. It is coherent especially with the topic Integration of Security Systems, Communications and Interoperability.

SMC project aims to develop a general method to monitor threats in the Cyberspace. As a result, it will provide improvement in the area of social order and public security.

Examples of the possible implementations:

— cyber crimes – monitoring of content published in the Internet, especially combining information from numerous sources enabling identification of many types of cyber crimes, e.g., wangles, frauds, illegal distribution of materials under copyright, etc.

— crisis management – a developed method will enable monitoring of sense of insecurity level in specific social groups and communities. This allows to undertake prevention, support removal of crisis situation effects and carry on information campaign.

— economic crimes – using data from repositories that contain economic data e.g., WARSET, POLTAX, GIIF will enable to discover suspicious transactions or actions. This will help overcoming white-collar crimes.

The project offers an innovative solution that combines state-of-the-art research results from several fields: identity management, analyse of online social networks, information extraction, semantics, reasoning, data integration and forensic science.

Expected Impact

Final results of the SMC project include:

— technical documentation describing methods for data and information filtering and integration for assuring the security in cyberspace,

— proposition of business use cases for using developed methods,

— prototypical system that will enable:

- creation, management and update of threat profile,

- development of procedures for creation of threat metaprofiles,

- filtering of information from unstructured sources (shallow Internet) and structured (the deep Web) using threat profiles,

- feeding profiles with structured information,

- integration of filtered unstructured information with structured data.

Prototype will be tested on a pre-defined business scenario, prepared in cooperation with an administrative unit responsible for cyberspace security, e.g., Ministry of the Interior and Administration or other indicated administrative unit. This use case will be used as source of functional requirements for developed methods and applications, as well as source of project verification criteria.

Involved Constituency

The project consortium consists of two partners: Poznań University of Economics represented by Department of Information Systems (being the project coordinator) and an industrial partner Sygnity S.A. All tasks specified within the project are carried out jointly by both partners.

Established in 1926, Poznan University of Economics (PUE) is one of the oldest and most prestigious business universities in Poland. The university's main strengths are its educational experience, international relations, well-developed research base and its co-operation with business and industry. PUE has participated in a number of EU funded programmes, including e.g. SOCRATES/Erasmus, PHARE ACE, Leonardo da Vinci, and 5th, 6th and 7th FP projects e.g. PISTE, EURAREA, USE-ME.GOV, ASG, SUPER and Service Web 3.0.

Department of Information Systems carrying out tasks within the project belongs to the Faculty of Informatics and Electronic Economy, which is acknowledged as outstanding by the Accreditation Committee by Polish Ministry of Science and Higher Education. DIS conducts research in the area of: knowledge representation techniques, information extraction, information retrieval and filtering (with emphasis put on personalization and contextualisation), extraction and integration of data from the deep Web, service orientation as well as profiling and estimation of quality parameters of software.

Sygnity is a leading supplier of IT solutions in Poland. It executes even the most advanced IT projects for both corporate clients and institutional ones. Sygnity possesses in-house solutions supported by technologies and products used world-wide. It offers a full range of services from consulting through realization, to outsourcing of IT projects for large and medium-sized enterprises in the most important sectors of the economy as well as institutions of public administrations.

The Sygnity Group arose from the merger of ComputerLand and Emax and at the same time the respective Capital Groups which they headed. At present the Group employs over 1600 employees, including experts

with extensive IT know-how and specialists with experience in particular branches who follow and analyze key sectors of the Polish economy and trends on world markets. The Group is composed of 12 companies.

4.14.7. Implementation of cross-protect router

Overall Scope

The main goal of the project is an implementation of Cross-Protect router, which realizes the Flow-Aware Networking concept. The work will take three years (from September 2011). The project will be realized in three steps: research work on Flow-Aware Networks, implementation of the Cross-Protect router and implementation of new modules for the router, which will enhance data transmission.

In particular, it is planned to propose and implement mechanisms, which will improve operations in the

admission control and scheduler blocks. Moreover, the reliability and security solutions will be analyzed. The researchers will also work on mechanisms, which will enhance data transmission in wireless FAN.

R&D Scope

Methodologically speaking, the project will have a theoretically-simulative-implementative character. Firstly, the impact of new mechanisms on the FAN network performance will be evaluated. This step will also result in providing guidelines for the network operators on how to set certain parameters of FAN routers. This stage requires the probabilistic analysis and statistics. Secondly, the role of new mechanisms will be tested via simulation experiments. In case of new mechanisms, simulations are compulsory element, as they provide assessment on which mechanisms are sufficiently effective to be implemented in the final stage of the project. Simulations will also help us to demonstrate the usefulness of the proposed solutions.

In practice, particular mechanisms to be introduced in the FAN networks will be defined and characterized first. Next, the theoretical analysis concerning their viability as well as guidelines on setting corresponding router parameters will be shown. In the project, the standard network simulation tools will be used, i.e., well known and widely acknowledged network simulator ns-2 and standard C++ programming tools.

The main outcome of the project will be implementing the mechanisms proposed in the first stage of the project and creating a fully-functional FAN router. Initially, only the basic FAN router will be assembled. However, next, its functionality will be enhanced by new congestion control, service differentiation mechanisms as well as reliability and security modules. For the implementation purposes one of the architectures platform will be used:

— OpenFlow platform,

— Click platform,

— Linux system implementations.

OpenFlow is an innovative product based on the open source software, therefore, with the open possibilities to be modified and adjusted. This solution was proposed mainly as the platform for the academic researches which allows for implementing new network protocols in the real networks. It is, thus, possible to create and implement new functionalities, routing protocols, queuing systems etc. in the chosen routers. The „Click" platform allows for software implementation of a router. It is a flexible and ensures possibility for implementation of new functional elements. The third option is based on the router capabilities of the Linux-based system. The choice of the implementing platform is planned by the end of the first year of the project. The decision will be based on the simulation results and on new capabilities of those three proposals (especially as OpenFlow is currently under rapid development).

The final result of the project will be a fully-functional FAN router, which can be implemented in the real computer networks. The router will be tested in lab and in real networks (including ISP networks).

Expected Impact

The aim of the project is to develop and implement mechanisms of the Cross-Protect router, the standard interconnecting device of the Flow-Aware Networks (FAN). FAN networks are to form a competition for the currently available QoS assurance architecture for the IP based networks, i.e., the Differentiated Services (DiffServ). Positive outcome of the project research can lead to developing the mechanisms that will be applied in routers used to build FAN networks all over the world. These networks will form the next generation Internet.

During the first stage, new methods of realizing admission control and packet scheduling will be proposed and fully analyzed. Particularly, in the admission control block, the following mechanisms will be developed:

— mechanisms to allow fast admission of the streaming flows in the admission control block

— mechanisms which enhance the standard service differentiation routing proposed by FAN

— mechanisms which limit the maximum number of admitted flows during a certain time interval

— new methods of packet scheduling

In the second stage, the basic FAN router will be created. This will be the most intense stage and will require the most effort and work from all the participants. Simultaneously to the implementations, the resilience and security components will also be developed.

Third and final stage of the project will consist the tests of the created FAN router in the laboratory environment. The test-bed network will be assembled in which all the routers will be FAN-based. The final outcome of the project will be created and fully-tested Cross-Protect router with additional (mentioned

above) mechanisms as well as with reliability and security components. Moreover a new TCP version will be implemented to enhance wireless transmission.

The proposed topic is important both from the theoretical and practical perspective. The proposed heoretical solutions may find their place in the congestion control and traffic engineering analysis in he computer networks. On the other hand, they can be truly valuable for the network operators, both in Poland and around the world. Internet Service Providers are also interested in results of the project, e.g., GHNet. The practical implementation of the Cross-Protect router will be a significant step forward to advertising the FAN networks to the global market.

The conducted simulative analysis and laboratory tests should confirm positive aspects of the proposed mechanisms. The final result of the project may form a main element of the modern computer networks and the Internet. Most of the up-to-date analysis show that in the next generation Internet, the transmissions will be served in a flow-based manner, rather than (as currently) in a packet-based way. The FAN router is perfectly suited for the future Internet.

Additionally, the proposed solution is in accordance with the network neutrality concepts. As such, Cross-Protect routers will be adequate for the upcoming trends and requirements of the next generation networks.

Engaging in the presented problem of creating the Cross-Protect router is a result of the cooperation between the Department of Telecommunications of AGH and the French national telecom operator

France Telecom, the employee of which, Mr James Roberts, PhD, is the author of the Flow-Aware Networking concept. The applicant and project participants are experts in Flow-Aware Networks issues. The achievements of the applicant and of the rest of the team, as well as the collaboration with the other research institutes and telecom operators across Europe, indicate a high probability of a positive outcome of the project. The obtained results will be of significant scientific and commercial value and will allow for the first attempt to manufacture the Cross-Protect routers, routers realizing the Flow-Aware Networking concept.

The obtained results will be groundbreaking for the FAN networks, as they will significantly improve the performance of the computer networks. Additionally, they will form a starting point for the further research in this or the other network QoS architectures.

Presenting the real device to the equipment manufacturers will help to convince them that the solution truly works as expected. This will significantly increase the chance of largescale implementations of the FAN concept. The solutions proposed during the project realization will be protected by patents.

Involved Constituency

The project will be realized by researchers from the Department of Telecommunications of the AGH University of Science and Technology.

The project is funded by the Polish National Centre for Research and Development (www.ncbir.pl) under the LIDER programme.

4.15.   Portugal

4.15.1. Cloud Counselling for Youths

Overall Scope

Key Information

Runs from: Jan. 2011 – Jan. 2013 (24 months)

Website(s): Under development

Summary

Taking advantage of Portugal's mobile phone penetration rate of 117% this project provides a service of cloud counselling support to young members of communities facing social issues via sms communication. This initiative relies on a network of qualified volunteers that log in to a robust Web-based interface in order to manage conversations. The information collected from each interaction is automatically forwarded on a daily basis to the appropriate social institutions according to the type and urgency level assigned to each interaction. The use of mobile technology for these situations presents an innovative platform with which youths are deeply comfortable with, and compared to traditional help lines this system offers a higher level of anonymity and discretion, which are crucial requirements to be met when dealing with youths in socially susceptible situations.

Objectives

— To bridge socially problematic communities with social institutions

— Use of innovative technology in order to empower the communities

— Provide youths with a support network that is adapted to their intrinsic use of technology

Highlights

— innovate use of technology: SMS technology (and its conversion to data) operating with web based software in order to provide youths with a platform that aims to respond to the specifications of the young generation's use of digital technology.

— strategic relevance and pilot implementations in place: As a pilot implementation, the RLabs in South Africa has a counselling team have been working with a cloud-based solution. The project has been a success, as it has changed hundreds of lives. Typically 20,000 messages are exchanged per hour! It is aimed to follow the main orientation of RLabs considering the relevant cultural differences between South Africa and Portugal

— excellence in themed areas and/or cross-domain: being such a inter-disciplinary and cross-domain project, this initiative requires expertise in a range of knowledge fields. As such, both coordinators of this project are PhD students of Digital media in FEUP University of Porto. Also, FEUP has agreed to provide resources to this project for the benefit of its community. Finally, the existence of a close interaction with various Psychology research groups of University of Porto and various social NGOs working on the ground in Portugal is expected too fully cover both the technical and social needs and challenged to come.

R&D Scope

On top of a rather developed and robust web-based platform that enables logged users/counsellors to simultaneously manage different interactions, the most innovative technology being used iin this initiative is related to the use of SMS technology as a chatting platform requiring therefore the conversion of SMS to data. In this project, the SMS technology is expected to operate, in the near future, side by side with a web chatting service or a phone app accessible though the Cloud Counselling website.

Expected Impact

Portugal is a country with over 100% mobile phone penetration rate. The mobile revolution that has swept through Portugal has made mobile telephony widely available. However, as a nation, Portugal still has substantial social issues. This project expects to find the opportunity to use mobile phone in order to face different kinds of social issues (such as drugs, violence, bullying, suicide, STD's) and reconstruct communities by providing them with professional counselling and social institutions engagement.

Involved Constituency

Currently, there is a major partnership with FEUP (Engineering Faculty of University of Porto). The world class expertise level that FEUP provides to this project is of undeniable value.

— The Mobile Technology Research Group is collaborating in the development of the software interface for the management of digital interactions

— FEUP as an institution, has agreed to take part in this initiative, and has come forward to share their IT resources, meaning that the servers in which this platform is expected to run offer unmatchable security and speed.

Also, there is a close connection between this project and various research groups of Psychology at University of Porto.

4.15.2. Panorama Networks

Overall Scope

Key Information

Runs from: Jan. 2009 – Jan. 2011 (24 months)

Website(s): http://www.it.pt/project_detail_p.asp?ID=1233

Summary

The proliferation of the Internet and wireless access technologies introduced the constant mobile paradigm, where users want to be always connected making use of the best available networks and technologies. In order to provide seamless connectivity among the new wireless access technologies, such as Wi-Fi, WiMAX and 3GPP (UMTS, HSPA and/or LTE), the IEEE 802.21 standard has defined the media independent handover framework. However, although there is a recognized importance of the IEEE 802.21 framework in the vertical handover optimization procedures, it is still necessary to improve this framework to the radio access technologies individual features. The networking part of this project aims to integrate the process of the IEEE 802.21 framework with the aforementioned wireless access technologies, enabling the complete support of all the envisioned IEEE 802.21 handover phases in the support of handovers with Quality of Service between all technologies: Ethernet, Wi-Fi, WiMAX, 3G, LTE.

Objectives

— Define and specify an IEEE 802.21-based heterogeneous mobility architecture, which supports seamless vertical handovers in Broadband Wireless Access (BWA) networks, such as WiMAX, Wi-Fi and 3GPP (UMTS and LTE). It is defined the integration process of IEEE 802.21 media independent framework with the aforesaid radio access technologies, enabling the complete support of all the envisioned handover phases.

— Optimization of the IEEE 802.21 framework to allow the information server (IS) to store and manage context information. With a Context-aware IS (CIS), relevant static and dynamic information from the mobile elements and the network, such as the terminal capabilities, user preferences, battery level, running applications, available network resources and system performance measurements, can be provided to the mobility management entities in runtime, and therefore optimize the vertical handover decision functions procedures.

— Evaluation of the proposed enhancements to the IEEE 802.21 framework and of the handovers between all the referred technologies while the terminals include active communications of video, voice and data. The evaluation is performed through simulation in NS-2, and through the experimentation in a real testbed.

Highlights

This project was able to define, specify, simulate and implement the mobility of users between different technologies, integrating the mobility optimization process with the mobility management, being able to move communications of video, voice and data with decreased delay and packet loss. In the real experimental testbed, the handover delays
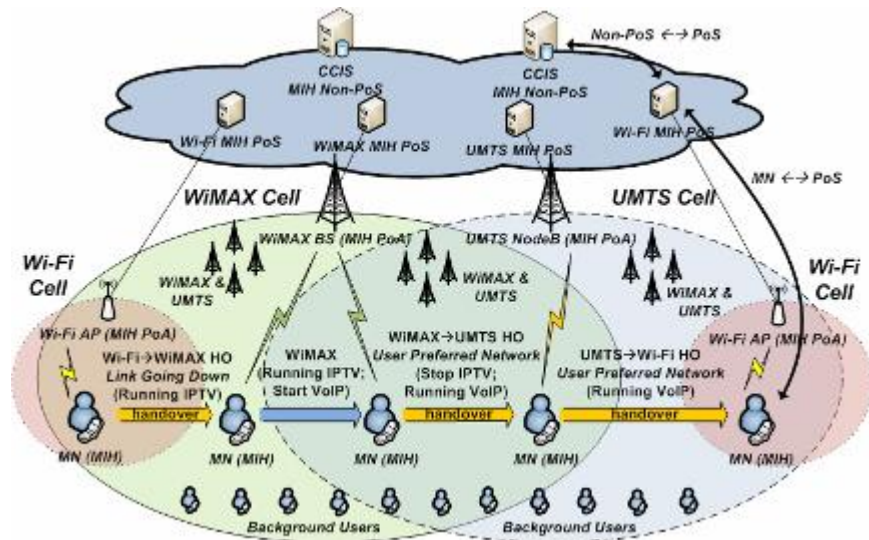
are reduced in the order of seconds to 100 msec; moreover, the losses decrease from 60% to no loss in the communications during handover. This is a great achievement, since it shows that it is possible to be moving, making handovers between technologies, without losing any information, and without noticing any disruption: this makes the mobile world real.

This project is performed in cooperation with Portugal Telecom Research branch, and the final demonstrator has been implemented in cooperation between IT and Portugal Telecom Inovação. Therefore, the relevance of the testbed and pilot implementation is of a strategic view inside Portugal Telecom.

R&D Scope

The developed architecture is made of new and advanced technologies: IPv6 support (with a 6to4 tunnel in the 3G case); Mobile IPv6 modified to interact with IEEE 802.21; IEEE 802.21 extended for resource query support and resource reservations for quality of service; IEEE 802.21 extended to interact with all technologies; dynamic and context-aware information server.

Expected Impact

As previously referred, the real pilot of an architecture that is able to support seamless mobility of users while moving between different technologies, is a great achievement in the mobile telecommunications world. The impact is large, as it will enable the access to the services, even in real-time, while moving around.

The project has also impact on the digital divide, as developing countries will be able to provide access to the customers, through wireless connections (which require lower investments); the users can move to the available technology without requiring 100% coverage with the same technologies.

The social impact on the mobile area is also huge, as the users will increase their connection on the move. The universal access and usability are also characteristics directly implied in the services provided by the platform.

Involved Constituency

This project is a cooperation between Portugal Telecom Inovação (research branch) and Institute de Telecomunicações (IT) – pole of Aveiro, and therefore, the work is developed in cooperation between academic and operator-based research for the specification, simulation and proof of concept activities.

4.16.   Romania

4.16.1. Risc-Expert

Overall Scope

Key Information

Full Name: System Based on Specific Knowledge and Semantics for the Prevention of the Major Occupational Risks

Runs from: Oct. 2008 – Jan. 2011 (38 months)

Website: http://193.230.3.43/risc/

Summary

The main purpose of the project is the development of a system and of a portal for analysis, description, classification and recording of the major occupational risks and of the preventive measures and computer-assisted training and consultancy for employees in organizations with major occupational risks.

The system will be adaptable for any domain with major occupational risks (industry, health, biology, construction, transportation, environment, agriculture etc) and will rely on a specialized language, on specialized knowledge and semantics for the risk prevention description. It will include software tools for the 'operator-activity-machine' communication and for the translation of the instructions existing in natural language (including in English) into a formalized, specialized and synthetic language for the risk prevention.

Objectives

— Design and development of reference ontology for the evaluation, classification and description of the risk factors, of the relationships among them, of the consequences and actions for their control and prevention;

— Design and development of domain-specific ontologies and knowledge bases (for the biological and industrial risks), by the specialization of the generic concepts, relationships and constraints in the reference ontology. The ontology of the biological risks will be tested and validated for a use category defined for an organization with biological occupational risks. The following categories of biological risks will be analyzed: risks specific to substances – bio-aerosols and chemical substances; intrinsic risks at the work place – increase of the patient home care; increased number of laboratories for analyses and research using dangerous substances; work with medical trash; risks generated by social or environmental phenomena – decreasing the work with biological substances in the advanced countries that leads to a weak development of the immunity regulatory mechanisms; climate change;

— Definition of an operator-activity-machine communication model and its use in the interface with the requestor for instructions on risk prevention in a certain activity;

Highlights

— the project proposes an innovative use of technologies in the risk management and prevention regarding: the knowledge organization for risk prevention, by the development of two-level ontologies (a reference ontology in the risk management domain; and, domain ontologies for domains with major risks); the access to the prevention instructions, by the adaptation of the access and of the provided information to the requirements of the training requestor (called operator); the formalization of the risk prevention instructions, by means of a specialized language, correlated with the reference ontology for the risk management; the user interface,

based on an operator-activity-machine communication model; the semantics-based analysis of the documents in natural language;

— the project promotes 2 pilot implementations at national level: biological risks and industrial risks;

— the project promotes excellence in cross-domains by offeering a multidisciplinary approach (informatics, biology, work security)

R&D Scope

The main technological categories that has been selected for the integration in the system are:

— technologies specific to the semantic Web (ontology editor, environment for Web service creation and publication) needed for the creation and use of the knowledge base and of the ontologies;

— database server, needed to ensure the knowledge base persistance;

— tools for the system security insurance;

— reliable and deterministic communication technologies. The network necessary resources and capabilities include communications as a service and operation support services;

— open standard interfaces.

These technologies has to be combined for building an unique Open Platform, which must provide open standard interfaces towards all the included sub-domain, as well as other domains.

Expected Impact

— Environmentally friendly: The Risc-Expert sistem will not have negative impact on the environment, on the existing work places, on the working conditions and on the health. The technologies used for the remote access to information will comply with the standards for the work security.

— Societal impacts: Facilitating the quick and specialized knowledge on the occupational risks and on the preventive measures, the system will increase the work security in organizations with major risks. An important consequence of the trust in the work security will be the attraction and stabilization of the personnel in the organizations with major risks.

Involved Constituency

Consortium is composed of three research institutes with technical expertise in: research in ITC (National Institute for Research and Development bin Informatics), Academia (National Institute for Virology), work

security (National Institute for Research and Development in Work Protection). All partners have experience in the execution and coordination of national projects and participate in European projects.

Because the project involves several organizations, it will be led according to the principles and methods specific to the management of a complex project. Collaboration between partners will rely on a Collaboration Agreement. Each partner has a responsible person who will lead, from technical and administrative points of view, the partner's activities. The project will have a person responsible with economic activities: the verification and book-keeping of the project expenses and the elaboration of the intermediate and final financial documents for the project.

Organization and planning. Each activity in each phase of the project will be performed by a limited group of persons, will have a precise deadline and a clear interface with the other activities of the phase and with the other phases. The fulfilment of the objectives established in the project proposal and the activity deadlines will be permanently checked for the conformity with the activity execution plan.

Monitoring. The project activities will be monitored according to the Realization Plan, by the project coordinator and by the partner responsible for each activity. Changes will be allowed with respect to the activity objective or to the inter-activity interface, depending on the research progress and on the intermediate results. Any activity change will be communicated to the persons involvrd in the respective activities.

Result evaluation. The activity execution and result quality will be permanently controlled, by internal intermediate meetings and evaluation. Each phase will end with the analysis of the project status and with a detailed plan of the next phase activities.

4.16.2. ROLINEST

Overall Scope

Key Information

Full Name: Romanian Library Network in Science and Technology

Runs from: On-going (Dec. 2004 – June 2006 for predecessor NUSIDOC)

Website: http://nusidoc.upb.ro/

Summary

Given the development of library information systems in Romania and the development of virtual libraries in Europe at project starting date, the project proposed, for the first time in Romania to setup a national system for information and documentation in science and technology based on the principle of virtual library catalogue. The design of the system was based on sharing information between involved libraries to create a virtual national library in science and technology, resulting in Romanian Library Network in Science and Technology – ROLINEST. In the same time, based on the National Data Communication System

for Education and Research ROEDUNET, it was ensured high quality communication among involved libraries and the central server, representing the node ROLINEST. The project proposed to improve internal infrastructure of involved libraries and their connectivity to ROEDUNET. Improved accessibility to content information is provided to users. Librarians involved in project working team established common cataloguing rules, to setup national accepted and spread cataloguing procedures. The system allows access to both bibliographic records and full text digital documents. Databases access is provided by multilingual interface both for users and librarians. Search procedures are based on ontology technologies also.

Objectives

— Joining the resources of largest Romanian libraries (especially central university libraries – BCUs) in a IT&C structure, based on Internet and Z39.50 communication protocole, to create a national virtual library, reducing the costs by shared subscription to S&T documentation at national level.

— Facilitation of simultaneous access for different user categories to all libraries resources included in the system, using sensitive to context criteria to identify requested documents, regardless the place in Romania where the user launches the request.

— Possibility to search requests and administration using multilingual interfaces : Romanian, English, German or Hungarian in Internet

Highlights

The purpose of this project was to create, for the first time in Romania, a virtual union of largest academic and research library catalogues, setting-up the core of the future national digital library as part EUROPEANA. The catalogues of the University Central Libraries (BCUs), that are also the largest university libraries in Romania, contain a large number of S&T documents recorded in their data bases (most of them purchased before 1990, but also items purchased after this date, subject of the retroconversion process). This model is intended to be rollup to the National Information System on project research funded by national and international funds (EU, World Bank, etc.) It is free for access to any user in Romania for digital library simultaneous interrogation.

The technical solution was implemented based on:

— connecting in Internet involved libraries catalogues by world recognised Z39.50 protocol to setup the Romanian Library Network in Science and Technology (ROLINEST); the connectivity is secured by firewalls to avoid uncontrolled access to sensitive resources;

— the communication network was supported by ROEDUNET to ensure national level connectivity, security and high speed access;

— a metasearch system (based on specially customised METALIB software), installed in the core of ROLINEST, allow users simultaneous search in more databases belonging to academic, research or

public libraries in Romania, as well as in other digital resources as reference full text databases, books or electronic journals accessing just one interface;

— ROLINEST uses SFX software based on ontologies for digital content management in S&T.

ROLINEST allows performance improvement of Romanian libraries information systems, to ensure a unitary operation based on existing recognised international standards, reaching similar performances to similar systems in other European countries. ROLINEST facilitates cooperation between libraries to share digital resources and consequently to reduce spending in parallel activities. Import/export of digital records between involved libraries is enabled. As a consequence, common accepted indexing, setting-up keywords and subjects based on same rules allow users to more effectively search and process digital content.

ROLINEST operates since 2005 as open system, continuously enriching with new involved libraries : at the beginning there were 6 libraries and now there are 12 of largest university and research involved libraries. URL address for ROLINEST is : rolinest.edu.ro

R&D Scope

NUSIDOC project had innovative development for Romania as it was proposed for the first time in to share involved libraries resources in a virtual national library accessible to all users in the country. The system developed, ROLINEST, uses advanced Internet Technology to interconnect the digital catalogues of libraries and advanced communication protocol Z39.50 for sharing information at user request regardless his location. The basis for connectivity is ROEDUNET network with newly developed infrastructure and communication protocols allowing high speed access. In near future, as ROEDUNET already started migration to IPv6, it is expected that ROLINEST will use as well this protocol with additional modifications. In the field of using library resources NUSIDOC project was innovative promoting special technical procedures to share information in Romanian libraries. International state of art standards were imposed to new developments in libraries. ROLINEST was developed as an innovative IT&C national virtual structure for Romania. Software solutions based on METALIB/SFX systems are state of art developments at international level. Development of ROLINEST was similar to other national systems as CASLIN in Czech Republic, FINELIB in Finland, and KOBV in Germany. Local catalogues are connected to Internet via Z39.50 protocol to communicate with ROLINEST central server. Cataloguing is developed in local systems and each request receives real time information from connected catalogues in uniform format based on metaindexes. The user receives inquiry results based on selected indexes from all connected OPAC catalogues. User is enabled to personalise individual profile for inquiries, including the multilingual interface. Involved libraries receive aggregated services of administration and reporting. They can share (import/export) records to ensure uniform format of records. This innovative system is based on local distributed databases with local digital collections connected to Internet. Communication between local systems (who are of different origin as Aleph, Vubis or Alice) is based on international standards (Z39.50, http, XML). User interface has multilingual characteristics : Romanian, English, German, Hungarian.

Special effort was devoted in the project to connect other libraries from scratch, as public County Library Mures from Targu Mures.

Expected Impact

NUSIDOC project has a very important role to promote state of art IT&C and Internet support to Romanian libraries development enabling them to share resources and organise the workflow as in all European developed countries, in secured environment. As a consequence ROLINEST was created as system to offer users free and simultaneous access to digital content and information deposited in the shared catalogues, as a virtual national catalogue, regardless the support. Other large Romanian libraries as Romanian National Library and Metropolitan Library Bucharest used the expertise developed in NUSIDOC project for their developments.

The main impact of ROLINEST is presented in following list:

— increasing access to richer documentary information using rationalized resources allows to increase competitiveness of research community offer in S&T fields,

— digital content is presented in a standard format allowing national level sharing of resources;

— increasing the visibility involved libraries in Romania and in EU;

— increasing the potential to partnership with other consortia from member states for efficient interlibrary resources exchanges and consequently for improving the offer of Romanian involved libraries;

— increasing professionals in information science productivity by more rational cataloguing, indexing and interlibrary loan as well as rational use of other library resources and consequently reducing dispenses for library subscriptions and information system maintenance;

— in 2006 Report of The State Secretary for Scientific Research it is mentioned that NUSIDOC project was one of the most important achievements in infrastructure development for research in Romania. www.mct.ro/img/…/1168949074Raport%202006%20Politici%20Guv.doc

Involved Constituency

The project was funded by Romanian Authority for Scientific Research. The project was run by University POLITEHNICA of Bucharest (UPB) through Centre for Technology Transfer in the Process Industries and National Institute for Information and Documentation (INID). Now ROLINEST core continues to be operated and maintained by UPB. Main professionals in the field were employed in the project to ensure a national multidisciplinary team. The partnership involved Romanian libraries committed to have a strong component of science and technology digital content. At the beginning four largest Central University Libraries (BCU "Carol I" Bucureşti, BCU "Mihail Eminescu" Iaşi, BCU "Eugen Todoran" Timişoara, BCU

"Lucian Blaga" Cluj-Napoca), National Research Institute of Nuclear Physics "Horia Hulubei"-IFIN HH) library, library of University POLITEHNICA of Bucharest were involved. Until now the number of involved libraries increased substantially as 12 libraries are involved : library of The Technical University Cluj-Napoca, County Mures public library of Targu-Mures with subsidiary TELEKI-BOLYAI, University POLITEHNICA of Timisoara, Technical University "Gheorghe Asachi" Iasi, University "Lucian Blaga" Sibiu as well as The Library of The Romanian Academy.

The system is open, so other libraries can connect as well in future.

4.17.   Spain

4.17.1. es.INTERNET

Overall Scope

Key Information

Full name: es.Internet: Technology Platform of convergence towards Future Internet

Website: http://www.idi.aetic.es/esInternet/

Contact secretariat: es.Internet@aetic.es

Summary

INITIATIVE: IMPLEMENTATION OF THE NATIONAL TECHNOLOGICAL PLATFORM es.INTERNET

Spanish Administration is highly interested in participating in the development of the Future Internet. An initiative promoted by the Ministry of Industry, Tourism and Trade (MITYC), the Ministry of Science and Innovation (MCI), and the CDTI (Industrial Technological Development Centre) with the support of important industrial companies and main Research Centres, resulted in the creation of the national Technological Platform es.Internet The Spanish Association of Telecom Operators, Information Technologies and Electronic of Spain (AETIC), is the main driver and core of the Secretariat of this Platform ensuring a transparent and dynamic body capable of amalgamating the participation of large, medium and small enterprises.

es.internet becomes as a framework to stimulate and promote Research in the Future Internet creating different plans and activities. Some of those activities could be funded by national R&D public aids.

According to the Spanish research programs, where Future Internet is regarded as a big challenge, a double focus is considered:

⎯ Long term: Foster Spanish participation in Research projects, most of them in the FP 7 and subsequent European Programs, also within national programs (Cenit, Avanza I+D etc.)

⎯ Short Term: In order to increase industrial participation in a crisis situation typical experimental development projects, in the framework of es.Internet, are considered. These projects can be funded either through the national programs (as Avanza I+D or CDTI) or international programs, as a Eureka Celtic Cluster.

R&D Scope

According to the es.Internet Platform vision document, its main research priorities are:

Internet of the Network

⎯ Advanced radio interfaces and mobile solutions.

⎯ Advanced connectivity.

⎯ Network control plane evolution.

⎯ New service platforms.

⎯ Re-configurability and cognitive communications.

⎯ Development of energy-friendly networks.

⎯ Research on scalability issues.

⎯ Business convergence.

⎯ Broadband devices and networks.

⎯ Satellite component

Internet of Users, Content and Knowledge

⎯ User profiling.

⎯ Context and User awareness.

⎯ User generated content/services.

⎯ User Experience.

⎯ Accessibility (e-Inclusion).

⎯ Social communities and Virtual Society.

— Innovative media contents

— 3D coding.

— Virtual Worlds.

— Innovative interaction.

— Augmented Reality.

— Multimedia search engines.

— Recommendation systems.

— New P2P/P4P services.

Internet of Things

— Wireless Object Networks.

— Ambient intelligence and smart spaces.

Internet of Services

— Service Delivery Platforms.

— Next-Generation SOA. (SOA for things, indexing of internal applications, semantic services, automatic behavior)

— Cloud computing

— Autonomic computing

Cross-domain issues

— Trust security and privacy.

— Resiliency and trustability.

— Software quality and process improvement.

— Business models.

— Green computing.

— Rights management.

— Governance for an open and neutrally accessible FI.

Experimental research

There is a high interest in this research, probably through the participation in international projects, but this part is not defined yet.

Expected Impact

It is foreseen the R&D efforts devoted to put in place the Future Internet will bring benefits in increasing European productivity and competitiveness along with a more social and territorial cohesion by means of reducing the digital divide.

In terms of economical benefits from the achievement of the technological objectives the following could be cited:

— A more focused research, with a set of balanced and well-defined areas, will avoid the current fragmentation of efforts; thus reducing the cost of innovation and the increasing likelihood of achieving the pursued aims.

— The cooperation among industry, academia and SME might provide the necessary scale to cope with great project whose ambition and complexity cannot be carried out by individual entities.

— The focus and efficiency gained will reduce, in general terms, the development lifecycles, and specifically the product and service time to market.

— Contributing to the creation of more and better jobs, characterized for the requirement of qualified skills that could be disseminated all over the enterprises and academia.

— Common technologies (Broadband devices and networks, virtual worlds etc) developed under the umbrella of Future Internet can be applied to the dairy working methods of the organizations, thus obtaining productivity gains. Possibility of transferring technologies across multiple sectors thus harnessing of the Future Internet research in a variety of cross-environments (health, transport, tourism etc).

— More efficient R&D spending by public authorities as those supported project will be well oriented towards a common objective and goal.

— Leverage effect of the private-public partnership investment in the innovation process as well as the mobilizing of further resources.

— Real creation of a digital economy based on the knowledge.

— Unification of markets, dismantling artificial barriers that could provide scale to have better performance as well.

An impact assessment to quantify these advantages must be performed, in parallel to the proper technological process of research and development, to adjust and maximize, in monetary terms, these capabilities.

In respect to the social benefits, the followings might be mentioned:

— The products and services derived from this area have clearly a potential to help Europe challenges either social (such as aging, security, safety and welfare etc.) or economical (loss of enterprises competitiveness, low productivity etc.)

— Capability to increase social and territorial cohesion by means of e-Inclusion.

— Chances to enhance people quality of life

— Potential benefits in education, relations among people and the administration, training etc.

Involved Constituency

The Secretariat of es.Internet is provided by AMETIC, which ensures the widest participation of different entities among Enterprises, Research Centres, Academia and other Institutions. AMETIC also provides the secretariat for other related Spanish Technology Platforms, like eNEM, eMOV, eMobility, eSEC, eVIA.

The Spanish es.Internet initiative is openly and directly targeting its full and deep involvement in the European Public and Private Partnerhip bodies on future internet issues.

es.Internet: Presidency and Executive board is composed by:

Chairmanship	Telefónica I+D
Vice chairmanship	Indra
	Atos Origin
	Universidad Politécnica de Madrid
Executive Board	Thales Alenia Space España
	HyC – Grupo Ericsson
	Isdefe
	CTTC
	Robotiker-Tecnalia
	ESI
	Imdea Software
	Fundación CTIC-W3C
	Vicomtech
	Planet Media

At the moment, es.Internet is also involving more than 400+ entities:
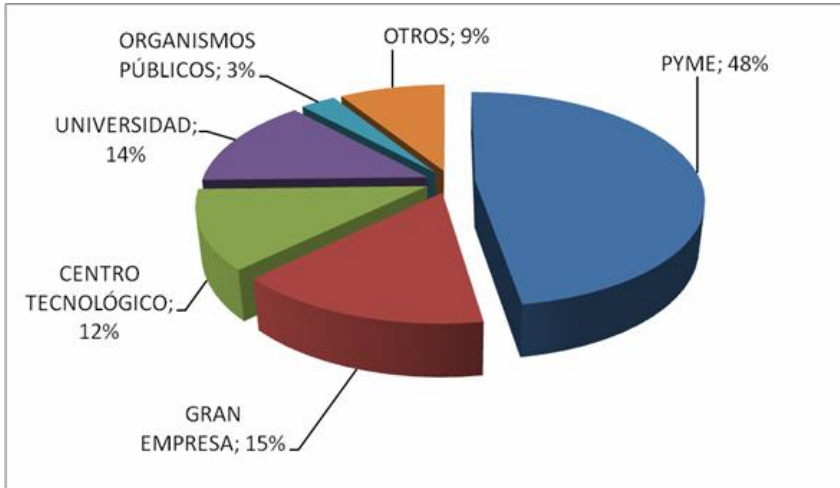
See: http://www.cefims.eu/2010/12/spain/ for full list of entities

4.17.2. I-Beds

Overall Scope

Key Information

Full name: Intelligent beds for clinical environments based on Internet of Things

Runs from: Jan. 2008 – April 2010 (27 months)

Website(s): http://ants.dif.um.es/projects/ibeds/index.php

Summary

This project exploits the use of Future Internet capabilities to enhance clinical services and extend these services seamlessly from the hospital to the home. Smart rooms in hospitals and homes support ubiquitous data collection, context and personal identification. Physiological and environmental data are collected, integrated and utilised to early detection of problems with the patient's health, and continuation of treatment and clinical supervision at home, after a patient is discharged from Hospital. For that purpose, this project has developed a platform for the patient's beds (MONERE), and a system for the clinical devices (MOVITAL) to provide a global connectivity and management capacity that links the patient to the Knowledge Based System, the Context Management Framework and the Identity Management Frameworks that will provide the functional capabilities of the whole infrastructure. The figure in Annex 1 illustrates the architecture.

Objectives

— Define a Future Internet architecture which supports interoperability of clinical data (CEN/ISO 13606) and personal health devices (IEEE 11073).

⸻ Develop a hardware platform to connect wireless the clinical sensors and the hospital beds from the hospital and AAL through Future Network technologies such as 6LoWPAN.

⸻ Offer security primitives and framework to ensure privacy of the patients and their information. And define a framework, which allows access to the clinical data respecting the patient's anonymity, in order to carry out clinical evaluations with real patient's data.

Highlights

1- Involvement and contact with industry

This project presents the advantage from the path of the research part (institutes and universities) to final users is defined by our partners. Specifically, the technological solution defined by us is integrated in the beds (furniture) by one partner dedicated to build hospital beds (Pardo Industries), this is distributed and integrated by our partners (3H from Flowlab and Sayos & Carrera). which are IT partner from several hospitals. Therefore, the technological transfer and communication with industrial partners is already included in the project.

2- Real applications (pilot implementations)

Probe of the mentioned involvement and contact with the industry is that the project has been deployed and is working at the Hospital "Clinica del Valles" in Sabadell (Barcelona), and a new evolution of this is going to be deployed in the new hospital of Denia (Alicante).

3- Use of technologies

The first version of the solution was based on barcode and sensor connected wires. This project has advanced this to the Internet of things, connecting them through 6LoWPAN and carrying out the identification of patients and objects with RFID technology.

4- Strategic relevance

In addition, to the hospitals, the solution has been extended to AAL environments. Specifically, a solution for diabetes has been developed, based also on the same architecture, annex 2 presents a diagram of the AAL living solution for diabetes.

5- Environmental friendly

The Monere platform is being used in a parallel project for green buildings, which is at present working in several buildings from the University of Murcia.

R&D Scope

Such as presented in the list of publications enclosed in annex 3. This project has presented some advances for the future internet technology.

1- A platform to support Internet of things: The presented architecture, Monere, in addition to adaptors of the current clinical devices to 6LoWPAN technology (Movital).

2- Mobility protocols for 6LoWPAN: Mobility protocols optimized for the hospitals requirements, in order to allow wireless monitored patients to their location.

3- Security primitives for 6LoWPAN devices: Optimization of authentication based on Elliptic Curve for Future Internet devices.

4- Security for RFID and NFC tags/cards: Evaluation and definition of solutions to avoid found security gaps in RFID and NFC technologies

5- Application of RFID to identify drugs (Pharmaceutical System)

6- Knowledge Based Systems to detect and predict illness: Intelligent Insulin Therapy system and solution to detect myocardial anomalies.

7- Standards for interoperability: It is also important to note that the architecture proposed is aligned with the standards both at the data exchange level based on CEN/ISO EN13606, HL7 and SNOMED, and the standards for personal health devices IEEE 11073.

Expected Impact

The impact is focused in the following 4 parts:

1- Health impact

The most important advantages with the integration of the Future Networks at hospitals and "at home" platforms are, on the one hand, to simplify the path of the patient's vital signs data, hence information from sensors is sent directly from the patient to the Information Systems. Thereby, patient information such as Electronic Health Record (EHR) is always updated, value errors are reduced since data manipulation by staff is avoided, and output is increased since staff does not need to waste time manually introducing this information from the patients to the EHR. In addition, artificial intelligences algorithms can be used to model data and extract information from physiological behaviour.

2- Social Impact

Health is a vertical domain with a high impact to society. Specifically, it is improving accessibility and mobility of disabled people and patients with chronic diseases. Fostering their autonomy and Independence.

3- Technological impact

Future Network Infrastructure: large scale connectivity, compatibility and ubiquity will guarantee healthcare professionals and patient access to medical information anywhere, enhancing citizen mobility.

Under this project mobility protocols have been defined for Future Internet clinical wireless devices, and security primitives for Future Internet clinical wireless devices.

4- Economical impact

On the one hand, the "at home" platform allows to continue therapy and supervision at home, therefore, in case the hospital has not enough beds to satisfy the entire demand from critical patients. It could release earlier patients from hospital to continue supervision and treatment at home. On the other hand, that platform allows increasing the capacity at the hospitals and reducing costs since patients stay less time at the hospital, since it is possible to carry out earlier release of the patients from the hospital. Consequently, this platform defines a healthcare model based on prevention, which means, first, a cheaper treatment of illness since it is treated in its first step, and second, the patient's survival probability is increased.

Involved Constituency

University of Murcia	University Of Navarra	Foundation AITIIP	Hospital beds PARDO	Hand Help Health E-healthj/telemedicine	Sayos& Carrera
Internet of things architecture 6LoWPAN and RFID development	Research IEEE 11073 personal health devices	Technological Institute Design and Industrial transfer	Adapting the hospital Beds to the Internet Of things architecture	Hosptials & Healthcare Environments	Networking
Universities , academia and research institute			SME	SME	SME

4.18.   Sweden

4.18.1. Ambient Sweden

Overall Scope

AMBIENT SWEDEN – Sweden a leading Internet nation in 2015

Sweden, as well as all European countries, has much to gain from being a leading Internet nation. The Internet is becoming more and more integrated into our everyday lives – both at home and at work, not

just in Sweden but everywhere in the world. To ensure we maintain a leading position, we need to fully understand our strengths and weaknesses in the field. In the IVA Internet Foresight project, we have identified Sweden's strengths and looked at threats and opportunities. We have also defined the concept of a "leading Internet nation," i.e. what is required in terms of infrastructure, usage, knowledge and leadership in order to be a leader in the field. The initiative's objective is to both secure and advance Sweden's positions with respect to the Internet of the future. Based on the current situation and the latest research findings, the project will set priorities and ensure that the responsible organisations and individuals implement the requisite measures so that Sweden can be a leading Internet nation in 2015. There are several areas where, if we work in a strategic way, we can be a leader in the international arena. Success is dependent on cooperation between a number of players. In the Ambient Sweden project, researchers from the academic world are working with experts from the user and operator side.

The initiative Ambient Sweden is being run along six different tracks with clearly defined focus areas: new opportunities for the private and public sectors, common platforms for services and infrastructure, development within schools and in working life, research and innovation, international profiling and, not least, confidence and effective regulations and legislation.

For more information about Ambient Sweden, please see www.iva.se/ambientsweden

R&D Scope

The initiative Ambient Sweden is being run along six different tracks with clearly defined focus areas:

Track 1: New opportunities for the private & public sectors

Work objectives:

— e-services. A directive issued by the Swedish Government in the form of a government policy to enable users to access the services or information they are seeking.

— Further develop Mobile 2.0 for services adapted for higher speeds.

— IT for sustainability. Monitor and influence technical infrastructure development, making it as energy efficient as possible.

Track leader: Olle Olsson, SICS

Track 2: Common platforms for services and infrastructure

Work objectives:

— Establish a meeting place for service market players in order to achieve interoperability and create joint services.

— Monitor any other standardisation initiatives.

— Promote advanced traffic exchange between operators.

Track leader: Tove Madsen, Acreo and Göran Olofsson, TeliaSonera

Track 3: Development within schools and in working life

Work objectives:

— Introduce computer studies and influence school administrators and politicians

— Introduce IT-based teaching and create an environment where it is natural to use computers and the Internet to support education, not only for technical subjects.

— Swedish government agencies should lead the way in promoting a more flexible working life

Track leader: Bo Boivie, HiQ

Track 4: Research, innovation and enterprise

Work objectives:

— Promote Internet innovation and research to position Sweden as a world leader.

— Work with the forces that are focusing on promoting an innovation-friendly climate.

Track leader: Ulf Wahlberg, Ericsson och Staffan Truvé, SICS

Track 5: Effective regulations and legislation

Work objectives:

— Draw up proposals for directives for a commission that will work on an information security act.

— Drive an e-ID initiative to create an e-ID solution that can be used outside government institutions.

— Introduce a system for quality labelling of Internet connections.

Track leader: Katarina Renman-Claesson, Konstnärernas Riksorganisation and Helena Andersson, MSB Swedish Civil Contingencies Agency

Track 6: International profiling

Work objectives:

— Organize and support a network that coordinates all relevant national activities to more efficient promote Swedish interests internationally.

Track leader: Östen Frånberg, IVA

Expected Impact

Why is it important for a country to be a successful Internet nation? In the same way as the industrial revolution helped increase prosperity in the 20th century, information technology and the Internet are helping to improve competitiveness in the 21st century. Sweden is a good Internet nation today, but can

be better – or more prominent. For every indicator for the prospects for industrialisation in the 1900s, there are similar indicators for positive development of the Internet in this century. And we should add that the Nordic region is driving development of mobile telephony. Thus, the prospects for being a leading Internet nation in 2015 are better for Sweden than for other nations if we act wisely and in time, taking the right steps and making the right investments. Constructive use of the Internet throughout a society will naturally support economic, democratic and climate-improving development. The Internet can be seen as a tool to get what we want, not a technology that sets limitations on our actions. The Internet was commercialised in 1995, and in 2015 we will see a society where the vast majority of people are connected to it. Development in the area has been rapid, which means the Internet is a relatively new phenomenon that in many respects, like a new building, has not "settled down" yet. Such rapid development, both in terms of usage and technology, begs the question: Which inventions, products, processes will be launched over the next ten years? Can we predict this? Factors such as the need to reduce environmental impact, an ageing population, the desire for more effective and flexible work situations and the Internet as a tool for education, will all impact development. So far, development within media and entertainment has been explosive and it is likely that media and entertainment will continue to drive the economic development of the Internet for the next decade.

The Internet contributes to Sweden's (or all nation's) development in various ways:

Securing welfare through growth and increased international competitiveness

A high employment rate in advanced Internet-based products and services. Those employed help to increase competitiveness and growth in the following ways:

— High technology attracts significant investment

— Helping to improve the efficiency of work processes

— Well-educated employees are required

— Significant export income from products and services

A sustainable society through the use of modern Internet technology

By using the Internet, travel can be reduced thereby reducing the impact on the environment

— The number of people involved in distance working one or two days a week will increase with an Internet with higher capacity between the home and the workplace.

— The number of overseas business trips will decline when video conferences become increasingly similar to personal meetings.

— Technological developments are leading to less energy consumption for Internet infrastructure.

Effective industries and societal functions

— Logistics are becoming more efficient and increasingly important in international trade. Wal Mart, H&M and IKEA are good examples of companies with more efficient processes.

— In the health care sector people are requiring more care for their money. The Internet can help improve and simplify communication between the health care system and the care provider and between players in the care chain.

— Refined and intelligent machine-to-machine communication is becoming more efficient in industry.

A better quality of life through easily accessible Internet services

— Routine tasks carried out between private individuals, businesses and the authorities are being simplified and rendered more efficient.

— Greater freedom of choice through more exposure to different alternatives.

— Improved general communication between people who, for various reasons, cannot meet in person.

Involved constituency

— Com Hem (ISP): www.comhem.se

— Ericsson (Equipment and service development): www.ericsson.com

— HiQ (Leading Internet consultancy company): www.hiq.se

— ISOC-SE: www.isoc.se

— IVA (Engineering academy): www.iva.se

— KTH (Royal Institute of Technology – technical university): www.kth.se

— PTS (The Swedish Post and Telecom Agency – Regulating body): www.pts.se

— SICS (Swedish Institute for Computer Science – Research institute): www.sics.se

— TDC (ISP): www.tdc.se

— Telenor (ISP): www.telenor.se

— TeliaSonera (ISP): www.teliasonera.com

— Tre (ISP, pure mobile ISP): www.tre.se

— VINNOVA (Swedish Governmental Agency for Innovation Systems): www.pts.se

For further information on Ambient Sweden, please contact:

Staffan Eriksson, MSc

Project Manager Ambient Sweden

Royal Swedish Academy of Engineering Sciences (IVA)

Phone +46 8 791 29 53

Mobile +46 70 551 07 07

E-mail: se@iva.se

4.19.   United Kingdom

4.19.1. *Digital Economy Programme*

Overall Scope

The Digital Economy is a new €110m broad cross-research council programme, aimed at realising the transformational impact of ICT for all aspects of business, society and government. Three large thematic hubs will be created that bring together academia, businesses as users broadly in the areas of, respectively: a) ubiquitous computing (especially with Creative & Transport sectors) b) rural economy, especially with respect to peculiar healthcare and transport requirements and c) inclusivity, especially with respect to local government, healthcare, transport and with a large user-adopter panel.

There are a number of Next Generation Access trials across the UK funded both by private and public sector initiatives such as:

— BT, Muswell Hill and Whitchurch, FTTC trials, 40Mbps

— BT, Ebbsfleet, FTTH trial, 100Mbps

— Virgin Media, DOCSIS 3.0 network, 50Mbps

— Yorkshire Forward, 500k households, 25Mbps

— H2O (Fibercity), Bournemouth and Dundee, FTTH, 100Mbps

One of the largest one was announced by the UK government in April 09 and comprises a €110m investment in NGA in South Yorkshire. NGA will be used to stimulate demand for new products and services by consumer and SMEs and demand for new equipment and infrastructure.

R&D Scope

Network Architecture. These are real implementation of Next Generation Networks and therefore are a necessary prelude to more comprehensive rollouts. However, the trials will allow value chains to form and allow operators to perform real field experimentation and perform advanced research on complex, real networks.

Expected impact

The UK government has released an interim report called Digital Britain which lays out the their commitment to provide universal statutory broadband access at 2 mbps to stimulate – in particular – the take up of digital government services. It is expected that NGA deployments will be a key contributor to this commitment. Of particular interest are also applications of NGA to healthcare and assisted living.

Involved constituency

UK Government, Technology Strategy Board, British Telecom, Virgin Media, H2O, various Regional Development Agencies, and more.

4.19.2. EnCoRe

Overall Scope

The EnCoRe project seeks to develop innovative technological mechanisms to enable and simplify the process of giving and revoking consent for the storage and use of personal data.

R&D Scope

Trust, Security, Privacy, Identity

The project will develop news technologies and methodologies for the use, storage, location and sharing of data together with exploring and experimenting with a holistic legal and regulatory framework. The project will make use of different scenarios to establish the problems in various areas, including social networks, e-government, and internally within organisations.

Expected impact

In order to gain access to the many services and benefits of a digital society, individuals and businesses are increasingly required to provide private information via the Internet to people, companies, government bodies and other institutions. EnCoRe aims to solve the imbalances that exist by allowing

individuals to have more control on how their personal information is used and could complement a new regulatory environment and meet the requirement of emerging business practice.

Involved constituency

Technology Strategy Board, Hewlett Packard, University of Warwick, others.

4.19.3. HIPNET

Overall Scope

The UK has made substantial progress in creating one of the most competitive broadband markets in the world and is seeing 3G mobile starting to make a real impact on services.

The HIPNet project supports the advancement knowledge and skills in the validation and verification of complex next generation networks through a combination of experimental development and modelling.

R&D Scope

Network Architecture. HIPNET focuses on traffic modelling and testing techniques needed to deliver Quality of Service (QoS) for multiple services at a controlled economic cost. Conditions such as traffic growth and major disruption will be taken into account. An end-to-end service delivery test-bed is being developed.

Expected impact

Next generation networks will enable new types of services and business models. QoS enhancements will critical enablers of dependable online services such as health monitoring and emergency services to happen.

Involved constituency

Technology Strategy Board, British Telecom, University of Essex, others

4.19.4. IU-ATC

Overall Scope

India-UK Advance Technology Centre (IU-ATC) of Excellence in Next Generation Networks Systems & Services

The initiative aims to establish the first virtual India-UK Advanced Technology Centre (IU-ATC) in Next Generation Networks, Systems and Services, which will put in place the support infrastructure to facilitate, develop and enable the Digital Economy of both countries.

R&D Scope

Network Architecture, Applications, Internet by and For People

Advanced telecommunication networks and multimedia services have benefitted a wide range of sectors such as education and health in Europe and USA. However in the rapidly expanding economy of India, which presents special requirements, this cannot easily be achieved by transplanting existing technical and engineering solutions, and the project aims at a fundamental rethink and develop novel solutions.

Expected impact

The project aims to provide research, innovation and wealth creation opportunities between UK and India.

Involved constituency

EPSRC, British Telecom, other partners

4.19.5. ITSS

Overall scope

The Intelligent Transport Systems Services (ITSS) Innovation Platform is one of the very first pilots in a new way of thinking to address the societal challenges of travel. Its vision is for the UK and Europe to become a world-leader in innovation in intelligent transport systems and services.

R&D Scope

Internet of Content and Knowledge, applied to Transport. The ITSS Innovation Platform is made of a number of interwoven, structured initiatives involving industry-led collaborative R&D efforts.

An initial intervention was concerned with Informed Personal Travel addressing the challenge of moving both people and goods efficiently, by linking technologies and systems to encourage seamless travel. Existing tools are not effectively exploited to create user-friendly solutions for informed personal travel. Of particular interest is the creation of reliable, credible and live information that people will understand, trust and want to continue to use.

Expected impact

The ITSS Innovation Platform sets out to provide interventions and financial support to overcome barriers in implementing effective solutions with Intelligent Transport Systems. Its primary aim is to work to overcome issues associated with people travel, and traffic related issues such as traffic network management, congestion, user travel information, safety, crime and infrastructure and vehicle connectivity.

Involved constituency

Technology Strategy Board, EPSRC, UK's Department for Transport, a number of participating universities and businesses.

4.19.6. Network Security

Overall scope

Present and future digital business models rely on interlinked and interdependent information infrastructures, enabled by appropriate security models. The Network Security Innovation Platform (NSIP) from the Technology Strategy Board looks into how to predict and mitigate information risks within digital services and infrastructures.

R&D Scope

Trust, Security, Privacy, Identity

The Network Security Innovation Platform is made of a number of interwoven, structured initiatives involving industry-led collaborative R&D efforts. Recent initiatives included:

— £4M investment in projects for "Trust Economics"

— £5.5M investment (with ESRC & EPSRC) in projects for "Ensuring Privacy and Consent"

— £6M investment (with EPSRC and CPNI) in projects for "Information Infrastructure Protection: managing complexity, risk and resilience"

Expected impact

NSIP aims to make the UK a more prosperous and secure environment for both the enterprise and the individual, in the face of the risks of information being compromised by disclosure (confidentiality), unreliability (integrity) or being unreachable (availability).

Alongside this, it is hoped that step changes within digital trust models and verification systems, software development and news design will bring about experimentation with and emergence of new business models.

Involved constituency

Technology Strategy Board, EPSRC, UK's Home Office (Interior Ministry), a number of participating universities and businesses, including Hewlett Packard.

4.19.7. User-Managed Access (UMA)

Overall Scope

Key Information

Runs from: Aug. 2009 – Dec. 2011 (29 months)

Website(s): http://kantarainitiative.org/confluence/display/uma/Home

Summary

User-Managed Access (UMA) is a protocol that gives individuals a unified control point for authorizing who and what can get access to their online personal data (such as identity attributes), content (such as photos), and services (such as viewing and creating status updates), no matter where these things live on the web. At this control point, a user can set policy that ensures that only requesters meeting criteria such as having a certain identity, being over a certain age, or being willing to agree to non-disclosure terms can succeed in gaining access. UMA can apply to a wide variety of sharing scenarios, such as sharing social data and calendars with friends, sharing health data securely with medical professionals, giving contract bookkeepers access to small-business financial data, and offering photos for sale. An international team of computer industry professionals, web service providers, and researchers has been involved in designing and implementing the draft UMA specifications.

(More information is available in the UMA FAQ.)

Objectives

— To develop a set of draft specifications that enables an individual to control the authorization and nature of data sharing with online services on the individual's behalf

— To facilitate the development of interoperable implementations of these specifications by others

— To empower individuals more fully as peers in their interactions with global networks that enable permissioned data sharing

(More information is available in the [UMA Work Group charter](#) and a [white paper](#) discussing UMA's ability to effect data usage control.)

Highlights

UMA is the first web-friendly open protocol specification that concretely enables an individual to control access by other people and programs to that individual's own data, residing in a variety of online sources. UMA achieves this through a central authorization manager that can be controlled with a management console interface (sometimes called a "digital footprint dashboard"), offering the user an easy way of applying access policies to all her data, content, and services. She doesn't even have to be online at the time a requesting party comes calling (unless her own policy requires some approval action on her part); her authorization manager bars the way automatically until the requesting side can prove that it deserves access.

UMA builds on the standard OAuth 2.0 protocol in a modular way, and UMA software components can use any policy-handling mechanisms, such as the Extensible Access Control Markup Language (XACML) standard. An early version of the UMA protocol was contributed to the Internet Engineering Task Force (IETF) for consideration as a next step after OAuth 2.0 is complete.

Because it is based on the authorizing user as a central pivot point within any given data-sharing ecosystem, the UMA approach supports the blossoming expectations of the new generation of digital natives who expect their sharing preferences to be respected. Thus, the UMA protocol incorporates elements of privacy by design. UMA-using deployments can therefore provide strongly privacy-enhancing data interactions to their users.

UMA has a natural affinity with online identity systems such as OpenID, particularly the newest version, the OAuth-based OpenID Connect. Utilizing this identity API can give an UMA authorization manager an interoperable way to demand that requesting parties provide trustworthy (third-party-asserted) identity claims about themselves that it can then use in enforcing user-dictated selective access.

A number of UMA implementation efforts have begun. At Newcastle University in the Northeast of England, a team have implemented UMA to provide a service called the Smart Authorization Manager or "SmartAM". This service allows the user to control access to resources hosted in UMA-enabled sites based on access control lists of Facebook friends. Java and Python versions of this work are anticipated to be available in open-source form shortly. Fraunhofer AISEC in Munich has also built an implementation. British company MyDex.org and US company Connect.Me are planning implementations.

From its inception, UMA has involved individuals from organizations across the globe. Its current participants (known as "UMAnitarians") include self-employed IT professionals, researchers, individuals employed by micro companies and SMEs, and others employed by multinational corporations.

(More information is available on the [UMA Implementations page](#), the [Participant Roster](#), the [SmartAM project blog](#), and statements from implementers and planned adopters in a recent [press release](#).).

R&D Scope

UMA's core design principles are to be: 1) simple; 2) OAuth-based; 3) agnostic to specific identifier systems; 4) RESTful; 5) modular in construction; 6) generative in effect (encouraging reuse in unexpected ways); and 7) developed fast. As a result, it has been able to take advantage of and influence new best practices in RESTful API design; new technologies in the form of the OAuth 2.0, OpenID Connect, and JSON Web Token specifications (which emerged only after the group's work began); the fast-changing landscape of user-centric identity management systems; and the preferences of web developers who have the power to make loosely coupled web-based service ecosystems succeed or fail.

The official end game of the UMA Work Group in Kantara is to contribute the results of its incubation work into the IETF, and the group has begun this process already with an initial contributed Internet-Draft (I-D).

(More information is available in the UMA Requirements document and the most recently submitted I-D.)

Expected Impact

UMA has the opportunity to change the balance of power between individuals and organizations so that granting access to data is no longer a matter of mere passive consent to a big company's terms of use. Rather, it becomes a valuable *offer* of access on user-specified terms. In this way, web users can start to act as peers in a network that enables selective sharing, in a user-experience environment that is completely cloud-based and accessible from anywhere.

Because such a change must appeal to all parties in a transaction, the UMA group has done significant work to analyze the contractual and legal properties of policy-mediated data sharing. UMA can become an important adjunct to the ongoing work being done among international identity management experts on "trust frameworks", enabling meaningful, practical, and web/cloud-friendly ways for parties to come together and establish enough trust to become data-sharing partners.

Ultimately, if the UMA protocol is accepted by the IETF as a work item, it has a strong likelihood of becoming the de facto method used by web service providers of ensuring user-controlled access to individual owned web resources.

(More information is available in the UMA Trust Model and 1.0 Core Protocol documents.).

Involved Constituency

The UMA activity is operated as a Kantara Initiative Work Group. Kantara has paying members, and its Work Groups and Discussion Groups have participants (including both individuals and organizations) who pay nothing to participate. Kantara's members and UMA's participants run the gamut of geographical

regions, organization sizes and sectors (including public and private sector), and vendor/user relationships.

(More information is available on the UMA Participant Roster and the Kantara Current Members page.).

Appendix A.   List of European Funding Agencies

List of European Funding Agencies and other relevant organizations in the field of Computer Science

(20/January/2012)

Austria

1. Der Wissenschaftsfund FWF

Website: http://www.fwf.ac.at

Contact: Dr. Stefan Mühlbachler (stefan.muehlbachler@fwf.ac.at, 004315056740)

2. Die Österreichische Forschungsförderungsgesellschaft FFG

Website: www.ffg.at

Contact: Thomas Zergoi (thomas.zergoi@ffg.at)

Belgium

1. Fonds de la Recherche Scientifique (FNRS)

Website : http://www2.frs-fnrs.be/

2. Fonds Wetenschappelijk Onderzoek (FWO)

Website : www.fwo.be

3. Het federaal wetenschapsbeleid

Website: www.belspo.be

4. Het agentschap voor Innovatie door Wetenschap en Technologie (IWT)

Website: www.iwt.be

Contact: Luc de Ridder (ldr@iwt.be)

Bulgaria

1. EXECUTIVE AGENCY "Electronic Communication Networks and Information Systems"

Website: http://www.esmis.government.bg/?t=agency

Cyprus

1. Research Promotion Foundation

Website: www.research.org.cy

2. Planning Bureau of the Republic of Cyprus

Website: http://www.planning.gov.cy/planning/planning.nsf/dmlindex_en/dmlindex_en?OpenDocument

Czech Republic

1. GACR - The Czech Science Foundation (Grantová agentura Ceské republiky)

Website: http://www.gacr.cz/international.htm

2. Academy of Sciences of the Czech Republic

Website: www.cas.cz

Denmark

1. Research Council: Forsknings- og Innovationsstyrelsen (The Danish Agency for Science, Technology and Innovation)

Website: http://en.fi.dk/

Contact: Mette Bjerge (Special Adviser) (0045 3544 6375, mbj@fi.dk)

Estonia

1. Research Council: The Estonian Science Foundation (Eesti Teadusfond)

Website: www.etf.ee

Finland

1. AKA - The Academy of Finland

Website: http://www.aka.fi/en-gb/A/

2. Tekes – the Finnish Funding Agency for Technology and Innovation

Website: www.tekes.fi

France

1. Agence Nationale de la Recherche

Website: http://www.agence-nationale-recherche.fr/

Computer Science dept.: Sciences et Technologies de l'information et de la communication

Contact persons: Bertrand Braunschweig (head of STIC) (bertrand.braunschweig@agencerecherche.fr)

Nakita Vodjdani (head of International Relations) (nakita.vodjdani@agencerecherche.fr)

2. Centre national de la recherche scientifique (CNRS)

Germany

1. Deutsche Forschungsgemeinschaft (DFG)

Website: www.dfg.de

Computer Science dept.: Ingenieurswissenschaft / Informatik

Contact person: Dr. Gerit Sonntag (Mrs.) (head of CS) (00492288852499, gerit.Sonntag@dfg.de)

2. BMBF - Bundesministerium für Bildung und Forschung

Website: www.bmbf.de

Contact: Volkmar Dietz (volkmar.dietz@bmbf.bund.de)

Greece

1. N.H.R.F - The National Hellenic Research Foundation

Website: http://www.eie.gr/index-en.html

Hungary

Hungary

1. OTKA - The Hungarian Scientific Research Fund

Website: www.otka.hu

2. The National Innovation Office (NIH)

Website: http://www.nih.gov.hu/english

Contact: Vilmos Németh (Vilmos.Nemeth@nih.gov.hu) or David Pap (david.pap@nih.gov.hu)

3. National Development Agency

Website: http://www.nfu.hu/?lang=en

Iceland

1. The Icelandic Centre for Research – RANNIS

Website: www.rannis.is

Contact person: Elisabet Andresdottir (Head of International Division) (elisabet@rannis.is, 003545155809)

Ireland

1. Science Foundation Ireland (SFI)

Website: www.sf.ie

Computer Science dept: Communications and Emergent Technologies

Contact persons: Prof. Fionn Murtagh (Director) (0035316073056, fionn.murtagh@sfi.ie) and Dr. Sandra Collins (Scientific Programme Manager)(sandra.collins@sfi.ie, 00353863832080)

2. Irish Research Council for Science, Engineering and Technology

Website: www.ircset.ie

Contact person: Martin Hynes (Executive Director) (0035312315000, mhynes@ircset.ie)

3. Enterprise Ireland

Website: www.enterprise-ireland.com

Israel

1. ISERD

Website: http://www.iserd.org.il/

2. Israel Science Foundation

Website: http://www.isf.org.il/

3. Technological Incubators Fund

Website: www.incubators.org.il

Contact: Yossi smuler hamamot@ocs.moit.gov.il

4. The Magnet fund

Website: www.magnet.org.il

Contact: Ilan Peled info@magnet.org.il

5. Ministry of Industry, Trade and Labor - The chief scientist fund

Website: http://www.tamas.gov.il/NR/exeres/79606C10-6797-4F5D-A743-CED7B05188C1.htm

Contact: Zeev.Adelman Zeev.Adelman@ocs.moital.gov.il

Italy

1. The National Research Council (Consiglio Nazionale delle Ricerche)
Website: www.cnr.it

Latvia

1. The Latvian Academy of Sciences
Website: http://www.lza.lv/

Lithuania

…

Luxembourg

1. Fonds National de la Recherche Luxembourg

Website: www.fnr.lu

Contact persons: Dr. Carlo Duprel (carlo.duprel@fnr.lu) or Dr. Andreea Monnat (andree.monnat@fnr.lu, 0035226192553)

Malta

…

Netherlands

1. Nederlandse Organisatie voor Wetenschappelijk Onderzoek (NWO)
Website: www.nwo.nl
Computer Science within the Chemical & Physical Sciences Division
Contact: Drs. Sjoerd Meihuizen (Programme manager) (0031-703440710, s.meihuizen@nwo.nl)

2. Technology Foundation STW
Website: www.stw.nl
Contact: Dr. Frank Karelse (f.karelse@stw.nl)

3. Agentschap NL

Website: www.agentschapnl.nl

Contact: Wolfgang Tostmann (Wolfgang.tostmann@agentschapnl.nl)

4. The Netherlands Organisation for Applied Scientific Research (TNO)

Website: www.tno.nl

Norway

1. The Research Council of Norway

Website: www.rcn.no

Poland

1. Ministry of Science and Higher Education

Website: www.nauka.gov.pl

Contact: Piotr Kępski (piotr.kepski@nauka.gov.pl) (tel. +48 22 52 92 234)

or Wiesław Majos (wieslaw.majos@nauka.gov.pl) (tel. +48 22 52 92 142)

 2. National Centre for Research and Development (NCBiR) *Responsible for applied research*

Website: www.ncbir.pl

Contact: Jacek Pardyak (j.pardyak@ncbir.pl) or Cezary Błaszczyk (c.blaszczyk@ncbir.pl)

3. National Centre for Science (currently being set up) *Responsible for basic research*

Website: www.ncn.gov.pl

Contact: biuro@ncn.gov.pl

Portugal

1. The Science and Technology Foundation (Fundação para a Ciência e a Tecnologia)

Website: http://www.fct.mctes.pt/

2. Knowledge Society Agency – UMIC

Website: www.umic.pt

Contact person: Prof. Luís Magalhães (President) (luis.magalhaes@umic.pt, 00351 211 119600) or Ana Neves

Romania

1. National Authority for Scientific Research

Website: www.mct.ro

Slovakia

1. Slovak Research and Development Agency (SRDA)

Website: www.apvv.sk

Contact person: Jana Tomkova (Head of EU Framework Programmes Unit) (jana.tomkova@apvv.sk, 00421 257204547)

Slovenia

1. Slovenian Research Agency (ARRS)

Website: www.arrs.gov.si

Spain

1. The Spanish National Research Council (CSIC - Consejo superior de investigaciones cientificas)
2. Ministry of Industry, Tourism and Commerce (MITYC), Several R&D programmes, www.mityc.es
3. Ministry of Science and Innovation (MICINN), Several R&D programmes, www.micinn.es
4. Centro Desarrollo Tecnologico e Industrial (CDTI), Several programmes, www.cdti.es

Sweden

1. The Swedish Research Council (Vetenskapsrådet)

Website: www.vr.se

2. VINNOVA

Website: www.vinnova.se

Contact: Jonas Wallberg

Switzerland

1. Swiss National Science Foundation (SNF)

Website: www.snf.ch

Contact person: Dr. Paul Burkhard (Head Division for Physical and Engineering Sciences)

(pburkhard@snf.ch, 0041313082323)

Turkey

…

United Kingdom

1. Engineering and Physical Sciences Research Council (EPSRC)

Website: www.epsrc.ac.uk

Computer Science dept: ICT programme

Contact person: Dr. Liam Blackwell (Head of ICT programme) (liam.blackwell@epsrc.ac.uk, 00441793444217)

2. Technology Strategy Board

Website: www.innovateuk.org

Contact person: Dr. Maurizio Pilu (Lead Technologist – Digital) (maurizio.pilu@tsb.gov.uk, 00441793442700)

Appendix B. Template for Data Gathering

Member States Initiatives/Activities on Future Internet

Template for gathering information from Member States

Please complete this template as completely as possible.

Please visit the database on the ceFIMS website (www.cefims.eu/database) to see examples of the type of information sought.

1.1 Member State name

Please include contact details (e-mail, postal address and any relevant websites)

1.2 Title and overall scope of the initiative(s)

Insert the title of the initiative and a brief summary (10-line max.). If no initiative is formally established in the Member State, R&D activities related to the Future Internet can equally be mentioned. For established initiatives, please include their duration and associated keywords.

1.2.1 Project Objectives *(max. 3 bullet points)*

-
-
-

1.2.2 Project Highlights

Highlight the innovative character of the project: innovate use of technologies; involvement and contacts with industry; environmentally friendly; strategic relevance and pilot implementations in place; excellence in themed areas and/or cross-domain; cross-regional and/or cross-national; etc.

1.3 R&D Scope

Insert here the main scientific and technological scope of the initiative/activities including objectives and the innovative character of the initiative:

1.4 Expected impact

State here what contribution the initiatives/activities will make towards reducing the Digital Divide and what societal impacts they will have on universal usability and access, etc. Please also indicate the extent to which they can or will contribute to sustainable economic growth and development.

1.5 Involved constituency

Describe here the academic and industrial stakeholders involved in the initiative and/or beneficiary of the investments. Describe the partnership and how it works e.g. public bodies (Local Authorities), industrial partners, SMEs, researchers/academia, funding agencies, citizen representative bodies, etc.

1.6 Budgets

Total Budget and Funding Mechanism: e.g. National public, National private, EU, other, etc.

Appendix C.   Institutions: FI Research

This section presents a preliminary list of institutions involved in Future Internet research across Europe, as collated by ceFIMS in its data-gathering efforts.

Akt infosys

Alcatel-Lucent

Atos Origin

Austrian Research Promotion Agency

Austrian Federal Ministry of Transport Innovation, and Technology

BCIX

British Telecom

Cap Digital

Cisco

City of-

    Arnhem

    Barcelona

    Deventer

    Dublin

    Nijmegen

    Zwolle

Coalesense

Czech Republic Ministry of Education, Youth and Sports

Czech Academy of Sciences

Danish Centre for Visual Impairment, Children and Youth

DERI

Det Norske Veritas

Deutsche Thomson

Digital Film Postproduction (formerly Grass Valley Germany)

Dublin City Council

Dublin Institute of Technology

Enterprise Ireland

Ericsson

Eurescom

eXact Learning Solutions (formerly GIUNTI Labs)

Fachhochschule Lübeck

Finnish Funding Agency for Technology & Innovation (TEKES)

Fraunhofer FOKUS

German Aerospace Centre (DLR)

German Ministry of Education & Research (BMBF)

Hewlett Packard

Hochschule für Angewandte Wissenschaften Hamburg

HTC

Hungarian National Authority

iGlue Ltd.

IBM

Indra

Infosim

Institute de Telecomunicações

Intel

Interoute

Intune Networks Ltd.

ISDEFE

LamdaNet

Link-Lab

Living Lab Malta

Luxembourg Ministry of Communication

Nextwork

Nokia Siemens Networks

Novay

NTT DOCOMO

Orcale (Sun Microsystems)

Polish Ministry of Health

Portugal Telecom Inovação

Poznan Supercomputing and Networking Center (PSNC)

Primtel

Qualcomm

Romanian National Institute for Research and Development in Informatics

Saxion

Sayos & Carerra

Science Foundation Ireland (SFI)

Scuola Superiore Sant'Anna

SINTEF Semantics

T-Mobile

T-Systems

Technology Strategy Board (TSB)

Telecom Italia

Telefonica I&D

Telenor

Thales

Tivit

Tixel

University of- *(incl. Technical Universities)*

    Athens

    Berlin

    Bremen

    Bucharest

    Budapest

    Darmstadt

    Dublin (UCD)

    Duisburg Essen

    Essex

    Hannover

    Hungary (Fine Arts)

    Ilmenau

    Kaiserslautern

    Limerick

Lorandt Eotvos

Lubeck

Luxembourg

Madeira

Madrid

Malta

Maynooth

Murcia

Navarra

Oulu

Oxford (Internet Institute)

Passau

Piraeus

Porto (Engineering & Psychology)

Poznan (Economics)

Southampton

Stuttgart

Trinity (TCD)

Warwick

UK Department of Transport

UK Home Office (Interior Ministry)

UPM

Valletta Local Council

Vicomtech

Virgin Media

Waterford Institute of Technology / TSSG

Zonerider Networks Ltd.