European
Commission

ICT for Societal Challenges

Editorial

European society is inexorably shifting in form and nature, influenced by powerful factors, including an ageing population, climate change, an uncertain economic situation, globalisation and lightening-speed technological change. In these circumstances, making the best, and most effective, use of resources – human, financial, material - is not merely desirable, it is absolutely essential.

The European Commission is creating the right conditions for smart, sustainable and inclusive growth, through the **Digital Agenda for Europe (DAE)** and the EU's new Research and Innovation programme, **Horizon 2020**. Information and Communication Technologies (ICTs) enable us to see the connections between seemingly disparate issues, like transport and energy or health and economic growth, and help us find comprehensive solutions, for example in the European Innovation Partnerships on Smart Cities and Communities and on Active and Healthy ageing. ICTs enhance our quality of life, push productivity and lead to new opportunities for EU citizens and businesses. ICTs frees up data, information, and creativity. They are the lifeblood of 21st century Europe, provided that, in an increasingly interconnected and digital world, we ensure that they can link and work with each other.

Nowhere this is more apparent than when digital technologies help tackle many of Europe's societal challenges: better healthcare, independent living for the elderly, delivering effective public services, energy saving, smart transport, secure internet, inclusion, preservation of cultural heritage.

This booklet highlights some of the many EU initiatives and co-funded research and innovation projects which address these societal challenges. This is not pure research for research's sake, but rather research with very practical applications which benefit us as individuals and as communities.

The EU is supporting breakthrough digitally-based solutions to these challenges, such as cyber-psychology to address obesity and depression, intelligent transport systems to cut traffic congestion and save fuel, drawing on social networks and open data to fight crime in smart cities, and privacy-respecting cyber security. This support is not just about developing nice-to-have solutions to improve quality of life, EU investment in these initiatives fosters innovation and helps seed new markets, while strengthening EU industry and completing the Digital Single Market, so crucial for our future employment and growth.

At a time when citizens and national governments are very legitimately wondering whether their contributions to the EU budget are a good use of scarce public funds, I firmly believe that our work on Societal Challenges provides real added value for European taxpayers. The EU is in a unique position to harness economies of scale from its investment in R&D, bring forward industry- leading standards or pave the way for large emerging markets, while finding solutions to issues which affect our citizens and communities.

Robert Madelin
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Living Healthy, Ageing Well

Better quality of care means that people can enjoy longer and more independent lives. Information and communication technology (ICT) can contribute to make this happen as it supports the promotion of healthy lifestyles and effective care from an early age up to seniority. It can help provide better and cheaper services for health and ageing well for European citizens wherever they are. How? By giving online access to personal health information, by supporting prevention and early diagnosis, by enabling personalised therapies and by helping older adults live at home independently for more years, rather than in hospitals or care centres.

Europe is ageing. In 2060, 30% of Europeans (172 million) will be over 65 (currently 17%). For every retired person there will be only 2 people working (the present ratio is 1:4). There will be an increasing shortage of professional and family carers and healthcare costs will rise sharply to 9% of EU GDP. But there is also a huge potential for innovation and a growing market for healthcare and well-being products and services. Between 2008 and 2011, the healthcare sector created 2 million jobs, and the global telecare and telehealth market is forecast to grow from € 7.6 to € 17.6 billion by 2015.

Digital solutions to improve people's quality of life can help respond at the same time to the demand for sustainable healthcare systems and the need for an ever competitive EU industry. To give an example, the introduction of ICT and telemedicine is estimated to improve efficiency of healthcare by 20%, improving at the same time the quality of life of patients, who become more and more active subjects in the definition and delivery of health services.

Technological innovation alone is not enough; organizational models and personal behaviours should also change. The first step is to put the people in the centre, empower them and reorganise health and social care around them. A second step is to ensure that we have the right people for the new emerging jobs, to develop new eHealth and assistive technologies, to create products and services and integrate them in the daily lives of millions of people. For that we need new skills and competencies.

The **Digital Agenda for Europe** has defined a number of objectives, including the implementation of interoperable electronic patient records which can be safely accessed and exchanged across the EU. By 2020, telemedicine services should be widely deployed. The **eHealth Network** of Member States' representatives works on these objectives, and the **eHealth Governance Initiative** develops the strategies, priorities, recommendations and guidelines to deliver eHealth across Europe. The **eHealth Action Plan 2012-2020** supports Member States in bringing forward interoperable eHealth services within and between national healthcare systems. Its many measures, from personal health management to research into personalised medicine, put patients at the centre of healthcare.

When it comes to ICT for Ageing Well, the **Digital Agenda for Europe** reinforces the **Ambient Assisted Living (AAL) Joint Programme** (JP). It aims to improve the quality of life of elderly people and strengthen the competitiveness of European industry in this field. It does so by funding applied research and R&D on ICT enhanced products and services for ageing well. Launched in 2008, this programme involves 23 European countries and has a total budget of € 700 million over six years – 50% provided by the AAL partner countries and the EU's 7th Research Framework Programme and the other half by participating private organisations.

To support and bootstrap the structural reform of care, the Commission launched the **European Innovation Partnership on Active and Healthy Ageing (EIP on AHA)** in the context of the EU 2020 flagship **Innovation Union**. Partners from all over Europe (end users, public authorities, industry, healthcare professionals and others) cooperate on concrete actions to improve elderly people's quality of life, support the long-term sustainability of Europe's health and social systems, foster EU growth and EU industry expansion in the field of active and healthy ageing. The final aim of the Partnership is to increase the healthy lifespan of EU citizens by 2 years by 2020.

Other funding sources for health and ageing well can be found in the **Competitiveness and Innovation Framework Programme**, the **Public Health Programme**, the **Structural Funds**, the **Programmes** for Research and Technological Development (**7th Framework Programme** and **Horizon 2020**).

Patients in the driving seat: personalised care and mobile health

Better care often starts with a better diagnosis, based on the patient's health history and current situation. ICT helps health professionals to improve the accuracy and the timeliness of their diagnosis and to fine-tune treatments to the patient's specific needs and profile.

The **euHeart** project covers part of the "Virtual Physiological Human" (VPH), which deals with biomedical modelling and simulation of the human body. It uses computer models of the diseased heart to select and personalise the most effective treatment for heart failure and heart rhythm disorders, but also coronary artery, and diseases of the aorta and valves. Doctors can use the simulation tools to predict the outcome of different types of therapy. The project was concluded in 2012, and is expected to be not only beneficial to patients, who get personalised and safe care, but also to society, thanks to lower medical costs for the associated therapies.

euHeart

euHeart uses clinical data from various sources, such as medical imaging, measurements of blood flow, blood pressure and electrocardiography. Computer models integrate behaviour of the heart and aorta at molecular, cellular, tissue and organ level. These models also ' know' how cardiovascular diseases disturb the correct functioning of the heart at these levels.

http://www.euHeart.eu

**Funded by the Seventh Framework Programme (FP7)
Duration: 2008-2012**

The **ARMOR** project tackles the most common brain disorder, epilepsy, which affects 1-2% of the population, especially children and adolescents. What can ICT do for such a common, serious and still incurable disease? The project uses sophisticated technologies to provide healthcare specialists with a framework, so they can monitor and analyse epilepsy-relevant multi-parametric data. The specificity of each patient and the need for constant adjustment of the treatments will be addressed through a personal health system (PHS), which allows for flexible monitoring and efficient diagnosis management.

ARMOR

The project combines clinical and basic neuroscience research with advanced data analysis, medical management tools and telecommunication to develop novel applications for the management of epilepsy.

It will deliver non-intrusive personal health system (PHS) for monitoring and early diagnosis of people with epilepsy and will support healthcare professionals by providing accurate analysis.

http://www.armor-project.eu

**Funded by the Seventh Framework Programme (FP7)
Duration: 2011-2014**

Telemedicine – the interaction between doctors and patients or among health professionals through electronic media – can help citizens receive personalized care, regardless of their location. The widespread uptake of telemedicine can also have great economic impact, as the European telecare market is expected to be worth over € 5 billion by 2015. Telemedicine applications and personal health systems are mature, yet the market has not developed on a large scale. Moreover, although there are some good examples, the transfer of solutions across healthcare centres and borders remains an exception rather than a rule.

The **RENEWING HEALTH** project seeks to deliver telemedicine and PHS services to the many people suffering from *Chronic Obstructive Pulmonary Diseases* (COPD), *diabetes* and *cardiovascular diseases*. The project implements large-scale real-life pilots to validate and evaluate innovative patient-centred personal health systems and telemedicine services. The ultimate goal is to demonstrate what PHS and telemedicine services can deliver: more effective and efficient care, improving of the quality of life and enhancing patients' involvement and empowerment.

RENEWING HEALTH

Applying the Model for Assessment of Telemedicine (MAST) on a total sample of 7900 patients suffering from COPD, the project provides the foundation for evidence of the effects of telemedicine services and PHS. Nine European Regions and partners collaborate to manage issues such as integration, patients' involvement and user perceptions, as well as transferability of knowledge and results pooled by the project to other regions in Europe.

http://www.renewinghealth.eu

Funded by the ICT Policy Support Programme (ICT PSP) – Competitiveness & Innovation Programme (CIP)
Duration: 2010-2013

ICT-based solutions empower citizens to manage their own health and enable them to look after themselves and maintain a healthy lifestyle. An increasing number of people appreciate the advantages of using devices, software applications or mobile apps for managing or tracking their health.

The **INTERSTRESS** project uses advanced ICT-based solutions to assess and treat a condition that most citizens experience in modern society: psychological stress. The project uses biosensors and mobile devices to conduct an "e-therapy" that bridges virtual and physical reality into one seamless reality: *interreality*. The objective is to enable people to detect and manage stress in every circumstance. In 2012 the project won the UN-based World Summit Award Mobile for the best mobile health application.

Living independently and involved in society

Active involvement in society of elderly, disabled and people with physical impairments starts by improving their living conditions in their own environment, and facilitating a social life. This also has a positive impact on their families and caregivers, enabling them to rebalance the time devoted to care in favour of quality aspects, nurturing the relationship with older persons.

The pilot project **DREAMING** developed a solution which integrates different services, (such as telecare, tele-medicine and elderly-friendly videoconference). These services help prolong *independent living* and reduce the number of hospitalizations. The platform is also designed to keep users socially engaged via video, sensors, and mobile communications.

The solution was tested in six pilot sites across Europe during the last 24 months of the project. The final results showed that the services were well accepted by the trial participants, whose majority experienced an increased sense of security.

Independent living is also at the core of the **ROSETTA** project, which specifically addressed people with *progressive chronic disabilities*, helping them to keep their independence and quality of life as long as possible, and supporting their carers. The project's targets were in particular people suffering from *dementia* (in the different stages of the illness) and Parkinson's disease.

In the period 2011-2012 the developed system was tested in field trials with users in Belgium, The Netherlands and Germany to evaluate not only the user friendliness of the system, but also its impact on the quality of life of the elderly people with chronic disabilities and their caregivers. After the project's completion in May 2012, the different parts of the Rosetta system are being progressively brought to the market.

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Ambient Assisted Living (AAL) solutions can offer great support to the elderly and their carers. As the demographic trend of an increasingly ageing population persists, the potential market for these solutions also expands. To facilitate the development and the adoption of AAL solutions, the **universAAL** project produced the first prototype of an open platform with standard specifications on which developers and service providers can build their applications in a cost-effective and quick way. The platform also offers a series of tools, such as "the store", which is an online marketplace for providers, developers and users.

UniversAAL

The platform consists of three main parts:

- Runtime support, a software environment providing services for the execution of AAL applications.
- Development support, which includes documentation, tools and an online developer depot of various development resources
- Community support, in particular: training and the online store.

http://www.universaal.org

Funded by the Seventh Framework Programme (FP7)
Duration: 2010- 2014

The solutions mentioned above show how ICT can offer better chances to people belonging to disadvantaged groups, such as the elderly and people with disabilities. Yet, all these technologies, in their pervasiveness, can also represent a barrier.

That's where the **GUIDE** ("Gentle user interfaces for elderly people") project can help. This project creates a software framework which supports accessibility of digital solutions. The aim is to allow developers to efficiently integrate accessibility and personalised features into their applications. GUIDE-enabled applications and services can automatically adapt their user interface to the specific impairments and preferences of elderly users.

GUIDE

The GUIDE system provides automatic integration and adaptation of various consolidated and next-generation user interface technologies, such as gesture interaction, voice control, avatars, second screen multi-touch devices and gyroscopic remote controls.

GUIDE puts a dedicated focus on the emerging Web & TV platforms and services (Connected TVs, Set-Top Boxes, etc.). These platforms have the potential to become the main media terminals in the users' homes, due to their convenience and wide acceptance.

http://www.guide-project.eu/

Funded by the Seventh Framework Programme (FP7)
Duration: 2010-2013

Managing health data to ensure quality care to everyone, everywhere

Providing patients with needed treatment, wherever they are, is one of biggest challenges for the European healthcare system. ICT can contribute to ensure that healthcare is affordable and accessible to all. It helps open up safe and high quality healthcare to everyone, everywhere in Europe, even in remote areas.

The collection and analysis of health data and the secure access to these data improve diagnosis and prevention. It also enables personalised treatment and it grants patients the opportunity to monitor their wellbeing status themselves.

On the one hand this implies sharing good practices in diagnosis and treatment of diseases to make high quality services available to all. On the other hand, it means giving people the opportunity to travel freely throughout Europe – knowing that they or their carers can access their health information from anywhere. The number of potential beneficiaries is enormous: 12,3 million EU citizens live in a Member State different from their origin and every year millions more travel to other EU countries. The resulting impact on health safety and quality of life is massive: the availability of vital information, especially for patients suffering from chronic diseases, enables them to move across borders without anxiety and to receive the most appropriate treatment whenever needed.

The **epSOS** pilot project validates and improves patient summaries and *ePrescriptions*. Patient summaries include general and medical information about the patient and his current medications. ePrescriptions enable the patient to obtain medication in any EU foreign pharmacy, as long as it participates in the epSOS pilot phase. Currently the project is testing how to make the patient summaries securely accessible to the European emergency services (112 emergency number) and it looks into the potential of the *European Health Insurance Card* as a tool for the electronic identification of patients.

Up to 50% of European adults search online for health information. The need for widespread online access to accurate, relevant information on diseases and therapies, as well as to personal health data, is essential. The same is true on the research side, where access to wide sets of health data for scientific purposes is vital for making progress in areas such as clinical trials and drugs safety.

Access to healthcare data helps researchers produce more accurate and faster tests on medicines to be launched on the market. New drugs undergo extensive trials prior to authorisation. Once they are on the market, clinicians are responsible for recognising and reporting suspected side effects. However, a number of recent drug safety issues have shown that adverse side-effects may be detected too late, when millions of patients have already been exposed. The **EU-ADR** project exploited advanced ICT to develop new ways of using existing clinical and biomedical data sources to detect Adverse Drug Reactions (ADRs) as early as possible. The project used the anonymous electronic healthcare records of more than 30 million European citizens for their EU-ADR integrated platform. This platform has already been successfully used in other projects to assess the relationships between specific drugs classes and specific adverse events. It is at the heart of the EU-ADR Alliance, a European collaboration framework for running drug safety studies.

In the same area, the **LINKED2SAFETY** project aims to overcome the fragmentation of the European healthcare information space by building an interoperable framework. It will enable the efficient and homogenized access to distributed Electronic Health Records (EHRs).

Linked2Safety

The project will develop an integrated system, including a scalable technical infrastructure and a patient data protection framework, to facilitate the semantic interlinking, sharing and reusing of different EHR repositories.

http://www.linked2safety-project.eu

Funded by the Seventh Framework Programme (FP7)
Duration: 2011-2014

Having a secure and quick access to health data supports monitoring the health status of patients experiencing chronic conditions. In short, it helps saving lives.

The **d-LIVER** project focuses on patients having liver problems, such as chronic or acute liver failure. It uses ICT to address the clinical need for a bio-artificial liver (BAL) and it supports the remote monitoring of the patient's condition in his home environment through a system based on biosensors. d-LIVER will enable the patients to stay more independent whilst being under constant medical supervision.

The system is expected to save up to 250.000 lives annually worldwide, for example by preventing chronic liver failure and mortality of patients on the transplant waiting list.

d-LIVER

The project is pursuing the delivery of more efficient bio-artificial liver (BAL) support devices.

These systems will be capable of constantly communicating the status of both the patient and the BAL remotely to central clinical services, in a secure and confidential manner, such that patient monitoring is continuous and intervention can be both swift and beneficial.

http://www.d-liver.eu/

Funded by the Seventh Framework Programme (FP7)
Duration: 2011-2015

Connecting the dots from diagnosis to care delivery: integrated care

Today, social care and healthcare services are often delivered separately by different providers in a fragmented system leading often to inefficiency.

The good news is that, worldwide, health systems are moving towards *"integrated care"* models, seeking to integrate and coordinate the management, organisation and delivery of health and care services related to diagnosis, treatment, care, rehabilitation and health promotion. Changes in lifestyle, empowerment of patients and relatives and better collaboration among the actors at different levels of the care chain are key parts of this process. What is the role of ICT? It plays a crucial role in this process, such as in the NEXES and CommonWell projects.

The **NEXES** project moved the focus from hospital care to primary and home care using ICT support. To this end, the project assessed deployment of four innovative Integrated Care Services (ICS) for *chronic patients* (respiratory, cardiac and type II diabetes mellitus) including well standardized patient-centred interventions: home-based wellness and exercise-training; enhanced care for frail patients; home hospitalization and early discharge and remote support to primary care for diagnosis and therapy.

The pilot was carried out in three different sites – Spain, Greece and Norway – where it developed insights into local structural and operational barriers which have to be overcome for further development of Integrated Care Services.

NEXES

Specific achievements of the project have been:

- Development of Integrated Care Services for chronic patients with enhanced effectiveness and reduced costs
- Consolidation of an open source modular Health Information Sharing Platform supporting organizational interoperability among actors and clinical decision support systems
- An innovative business case
- Strategies for scalability of the ICT services at regional level

http://www.nexeshealth.eu

Funded by the ICT Policy Support Programme (ICT PSP) - Competitiveness & Innovation Programme (CIP)
Duration: 2008-2012

In the same area, the **CommonWell** project delivered integrated telecare and telehealth services among social care providers and hospitals on open platforms. The developed services were targeted mainly for patients suffering from chronic diseases and professionals dealing with these conditions. The system collects and makes sure health parameters are monitored and health care providers receive up-to-date information about patients. The main advantage with this ICT solution is that it prevents unnecessary admissions to hospitals and patients can go on living actively and independently.

The project ended in early 2012 and integrated services are now in real-life operation at the four pilot sites established in Spain, Germany, England and the Netherlands.

CommonWell

The project implemented a platform which tested 4 different services in the pilot sites:

- Telecare integration for better emergency care
- Managed hospital admission for care providers
- Early Intervention and Telehealth for CODP patients
- Integrated support for heart failure patients.

http://commonwell.eu

Funded by the ICT Policy Support Programme (ICT PSP) – Competitiveness & Innovation Programme (CIP)
Duration: 2008-2012

Fall prevention

One in three people aged over 65 is at risk of falling and one in two for those over 80. Falls often have very serious psychological and physical consequences, including a real risk of fatality.

In this field, a group of 30 consortia, members of the European Innovation Partnership on Active and Healthy Ageing, has defined an action plan on fall prevention. The consortia are composed of over 150 partners from almost all EU Member States, representing public regional authorities, sub-national administrations, delivery organisations, healthcare organisations, academic institutions, industry and other organisations. The objective is to deliver evidence based validated and operational programmes for the prevention, early identification and management of falls across the EU by 2015.

Technology can help older adults and people with disabilities to walk and move safely as shown by the SMILING and I-DONT-FALL projects.

SMILING provides a solution for fall prevention: a "smart shoe" that retrains the elderly's motor skills, restores their postural balance and so reduces the probabilities of falling. The smart shoe underwent several user trials in different sites throughout Europe. The project also developed a comprehensive rehabilitation programme that can be followed in health care and fitness centres and, in the future, at home.

SMILING

The solution developed feeds the information about the patients' gait via sensors hidden in their shoes. After the walking pattern is analysed, the shoe performs small variations in height and slope on the patient's feet and legs. These variations loosen stiff walking patterns and bring back flexibility and stability.

http://www.smilingproject.eu

Funded by the Seventh Framework Programme (FP7)
Duration: 2008–2010

The recently launched project **I-DONT-FALL** seeks to boost the still low take up of ICT solutions for fall prevention. The project will deploy, pilot and evaluate a range of innovative ICT solutions for fall detection and prevention. The effectiveness of the solutions will be tested over three years by over 500 elderly users/ patients across different countries, cultures, age groups and fall risk factors.

I-DONT-FALL

The I-DONT-FALL platform offers integrated fall management solutions that allow therapies to be tailored to the specific needs, root causes, risk factors and cultural factors associated with fall incidents.

http://www.idontfall.eu

Funded by: ICT Policy Support Programme (ICT PSP) – Competitiveness & Innovation Programme (CIP)
Duration: 2012– 2015

Robotics for elderly care

Elderly people often live alone at home, even if they have relatives and/or external caregivers assisting them. As they get older the need for some form of home care or assistance tends to become stronger, but it is not always possible for their families to meet these needs. Robots might play the role of "shadow" assistants, helping the parents and unburdening the children.

SRS develops the prototype of a remote controlled robot as a home carer for the elderly. It shadows the role of the caregivers and works semi-autonomously, reducing the amount of physical presence needed from human carers, like family members. The final solution will help older adults to live independently for more years and it is expected to be further developed by industrial partners for the worldwide market.

SRS

The project will deliver the prototype solution thanks to the following innovation:

- HRI design principles and interaction patterns for semi-autonomous multi-role shadow robots in home environments.
- A safety-oriented framework derived through extensive usability and user acceptance.
- Mechanisms to enable the robot to be tele-operated, to perform effectively its tasks and learn from its experience.

http://www.srs-project.eu

Funded by the Seventh Framework Programme (FP7)
Duration: 2010-2013

The **EXCITE** project shows how robotic technologies can also support older people's social interaction. It is based on a mobile telepresence device (the **GIRAFF** platform) which connects the person in the house with the external world. Thanks to the videoconference facility, older adults can request help or receive "virtual visits" by caregivers, family and friends. The project has currently deployed 25 Giraff robots in 6 countries (Sweden, Denmark, Norway, Germany, Italy, and Spain) and will soon deploy 15 more. By 2015, the robot producer estimates to reach a total of 5,123 units sold.

EXCITE

The project's methodology is to involve the end users – the elderly and their caregivers – in the development phase of the prototype robot. The feedback on the prototype has been so far generated by cyclic on site user validations on a pan-European scale. The longitudinal analysis of the end users' needs has enabled a better understanding of parameters such as acceptance, integration in a domestic environment and suitability for social interaction. The results have been taken into account in the deployment of the marketable product.

http://www.excite-project.eu

Funded by the Ambient Assisted Living Joint Programme (AAL JP)
Duration: 2010–2012

Europe boasts an innovative ICT industry with a great number of large companies and SME's. The research base is there to develop products and services for innovation in healthcare. But buyers have difficulty in properly assessing how those new products can meet their needs. As a consequence industry is reluctant to invest in products for which demand is uncertain.

The **SILVER** project explores new ways of stimulating more "out of the box" thinking by adopting cross-border pre-commercial procurement (PCP). By acting as technologically demanding first buyers, public procurers drive innovation from the demand side. This way they can obtain prototype solutions supporting independent living. The project will run an open competition on innovative solutions using robotics technology. The competition will focus on the challenges to address, without specification of the final expected output. The aim is also to demonstrate the effectiveness of such processes to meet societal needs and lead to wider adoption by governments.

SILVER

The project will launch a call for innovative solutions. The call will foresee four phases:

- Solution Design
- Prototype Development
- Pre-commercial/small scale development
- Commercialization/diffusion of product/service.

http://www.silverpcp.eu

Funded by the Seventh Framework Programme (FP7)
Duration: 2012-2015

Efficient use of resources

The European Union is committed to building a low carbon society by setting ambitious energy and emissions objectives for 2020: to reduce greenhouse gas emissions by 20%, to increase the share of renewable energy to 20% and to make a 20% improvement in energy efficiency[1]. At the same time, the EU must ensure supply security and boost growth and competitiveness.

Great attention is given to the contribution policies, business strategies, technologies and individual behaviour can make to achieve a sustainable society. Information and Communication Technologies support less resource-intensive production and allow energy savings in, for example, buildings and electricity networks. Furthermore, ICT can provide useful information about environmental parameters and personal behaviour, which in return will raise awareness and trigger a more responsible attitude about energy use.

The Digital Agenda for Europe (DAE) emphasises the importance of quantifying the ICT industry's own energy performance and carbon footprint as well as its potential to render sectors such as buildings and energy generation and distribution more energy efficient. This is why the DAE highlights the importance of cross-sectorial industrial cooperation to accelerate the development and deployment of ICT-based solutions for smart grids and meters, near-zero energy buildings and more energy-efficient transport systems. In these regards, the DAE has set specific targets and tasks:

- the establishment of a commonly agreed methodology to quantify the energy and carbon footprint of ICT goods, services and companies;

- the support of partnerships between the ICT sector and major emitting sectors (e.g. buildings and construction, transport and logistics, energy distribution) to improve energy efficiency and substantially reduce greenhouse gas emissions. Smart Cities will be the framework within which the European Commission will support partnerships between the ICT, buildings, energy and transport sectors;

- the assessment of the potential contribution of smart grids to the decarbonisation of the economy and promoting their interoperability;

- an agreement between Member States on common functionalities for smart meters.

[1] http://ec.europa.eu/clima/policies/package/index_en.htm

One of the greatest challenges facing the EU is how best to design and adapt cities into smart intelligent and sustainable environments. Almost three quarters of Europeans live in cities, consuming 70% of the EU's energy. Congestion costs Europe about 1% of its GDP every year; most of it is located in urban areas. Smart urban technologies can make a major contribution to tackling many urban challenges. This is why in July 2012 a new European Innovation Partnership on Smart Cities and Communities (SCC) was launched to achieve a meaningful large-scale deployment of smart city solutions in Europe.

Water and waste management are two additional fields where European research can make a crucial contribution over the next few years. Besides these actions, the European Commission is also funding a whole series of research and innovation projects to improve the energy efficiency of data centres.

Changing behaviour at home and at work

Everyone can contribute to lowering our energy consumption. Awareness is the first step towards the improvement of energy use. This is the base-line of the **BeAware**

project, which has developed new information tools and services to help turn citizens into active energy-saving players. The project has developed Energy Life, a web-based solution for mobile phones which makes users become aware of the power consumption of their home appliances in real time, with the overall target of reducing power consumption in households by 15%.

BeAware

Energy Life is equipped with ambient interfaces allowing measurement of energy consumption of home appliances, helping users to monitor their consumption via mobile phones and adopt energy-saving behaviours. The solution uses gaming and learning tools, and provides real-time feedback and advice for energy savings.

http://www.energyawareness.eu/beaware

Funded by the Seventh Framework Programme (FP7)
Duration: 2008 – 2011

The **SAVE ENERGY** project uses a serious game (virtual computer game used for professional training purposes) with an engaging virtual environment for users to gain awareness, understanding and experience associated with energy saving attitudes. The main objective of SAVE ENERGY is to make use of ICT to transform the behaviour of users.

SAVE ENERGY

The project is developed and tested in five pilot buildings in five European cities. The buildings are equipped with sensors, meters and control devices to monitor overall energy use. The real time data gathered is then centralised and used to generate an action plan for reducing energy use via the 'serious game' interface and real time information.

http://www.ict4saveenergy.eu

Funded by the ICT Policy Support Programme (ICT PSP) – Competitiveness & Innovation Programme (CIP)
Duration: 2009 – 2011

Saving energy in public buildings and spaces

Until recently, the focus of energy reduction in public spaces has been primarily in schools and offices. Hospitals, however, also use a large amount of energy. The **HosPilot** project provides an ICT-based service to drastically reduce the energy consumption of newly built hospitals and of existing ones needing renovation, while increasing well-being and comfort of end-users, i.e. patients, medical staff and visitors. HosPilot works in two main areas: lighting and HVAC (Heating, Ventilation and Air Conditioning), which account for nearly 80% of all energy use in hospitals.

HoSPILOT

The HosPilot system aims at:

- Assessing the hospital's energy-saving potential;
- Providing hospitals with an ICT-based scheme to reduce energy consumption;
- Implementing the scheme;
- Fine-tuning the scheme for maximum energy saving through regular monitoring.

http://www.hospilot.eu/

Funded by the ICT Policy Support Programme (ICT PSP) – Competitiveness & Innovation Programme (CIP)
Duration: 2009 – 2012

Energy saving is also very important in social housing. Project **eSESH** for instance addresses both tenants and social housing providers, regional and national governments. By providing usable ICT solutions to tenants, project eSESH enables them to compare their energy consumption with other consumers, to review their own consumption history allowing them to take appropriate action to reduce it. eSESH will also provide social housing providers, regional and national governments with the data they need to optimise their energy-related policy and investment decisions at national, regional and organisational level.

Connecting to smart grids

Connecting ICT devices to smart grids is another source of energy savings which is considered as one of the sustainable solutions to invest in now and for the future.

The **SmartHouse/SmartGrid** project tests in particular how groups of smart houses – i.e. houses with advanced automatic systems for lighting, heating and other functions – can achieve higher levels of energy efficiency by connecting them into a digital network. The project builds on existing industry standards from the ICT and the energy sectors and communication and computing capabilities which are widespread in normal houses and working environments.

It has a three-fold goal: improving energy efficiency, increasing the penetration of renewable energies, and diversifying and decentralizing Europe's energy mix.

SmartHouse/SmartGrid

The technology is field-tested in three countries, each focusing on a specific aspect:

- The Netherlands: how to handle large scale communication, negotiation and information exchange between thousands of smart energy devices simultaneously;
- Germany: how to interact intelligently with customers and deliver optimal home energy management;
- Greece: how to control smart energy devices in a fully decentralized and bottom-up way to achieve optimal energy efficiency and higher supply security for end-users.

http://www.smarthouse-smartgrid.eu

Funded by the Seventh Framework Programme (FP7)
Duration: 2008 – 2011

The project **WEB to Energy** (W2E) aims to develop an open, universally accessible and standardized ICT communication infrastructure that will enable the Europe-wide electricity network of the future. The project tries to address problems that arise from the volatility of renewable energy sources, minimize supply interruptions and adapt tariffs to demand. Industrial companies in W2E will commercialise the results, including deployment in their whole supply area.

W2E

11 European companies work together to establish a Smart Grid in their supply area through installation of communication links to power producers, grid terminals and the consumers.

https://www.web2energy.com/

Funded by the Seventh Framework Programme (FP7)
Duration: 2010 – 2012

Smart Cities

The <u>European Innovation Partnership on Smart Cities</u> proposes to pool resources to support the demonstration of smart solutions in urban areas. This will enable innovative, integrated and efficient technologies to roll out and enter the market more easily, while placing cities at the centre of innovation.

In addition to research projects, the new Lighthouse projects will also tackle issues at the intersection of the transport, energy and ICT sectors. They will forge strong partnerships with local leaders and municipal authorities to engage and empower citizens and local stakeholders in order to reduce greenhouse gas emissions and energy consumption.

NOBEL is a pioneering project in this area and has been tested in a small municipality in Valencia (Spain), which proves that the Smart Cities concept doesn't only apply to big capitals. The NOBEL project is building an energy brokerage system so consumers can communicate their energy needs directly to energy producers, thereby optimising energy production and distribution. The project has also tested in real conditions the adaptation of the luminosity level of public lighting based on traffic conditions to achieve energy savings while ensuring the security and comfort of both pedestrians and drivers.

NOBEL

The NOBEL project results include:

- IPv6 software layer for future smart meters and embedded devices in a smart grid;
- Middleware for data capturing and processing energy data on a smart grid;
- A citizen platform to obtain real-time information and participate in the brokerage of electricity.

http://www.ict-nobel.eu/

Funded by the Seventh Framework Programme (FP7)
Duration: 2010 – 2012

Using technology to save water in Europe

ICT has been recognised as a key enabler for innovation in water management and will be one of the priority areas of the European Innovation Partnership on Water. New technologies can help to smart up the drinking water and waste water networks so as to find leakages more quickly, guarantee water supply and quality and prevent waste of water. They also enable water authorities and consumers to receive real time information on these parameters. In this regard, new batches of promising FP7 projects will soon start producing results on ICT for efficient water resources management.

@qua is a project that promotes the uptake of ICT solutions to address the efficiency problems faced by public and private services of the water management domain. 17 participants from 10 EU countries contribute their expertise, knowledge and awareness from various domains to meet water efficiency objectives. This network addresses all water management issues, from resources to societal changes, using a wide range of ICT solutions: data acquisition, numerical modelling, real-time monitoring and field operation management.

@qua

The network goals are:

- Identifying the gaps and expectations of the water domain stakeholders on ICT solutions;
- Identifying and validating innovative ICT;
- Developing a "level of sharing" of each ICT solution in order to address interoperability, standards, architecture and roadmap for implementation issues;
- Produce guidelines, standards and specifications on specific ICT solutions.

http://www.a-qua.eu/

Funded by the ICT Policy Support Programme (ICT PSP) – Competitiveness & Innovation Programme (CIP)
Duration: 2011 – 2013

Climate change adaptation

More than two thirds of European cities are regularly confronted with climate change induced disasters. Early Warning Systems (EWS) provide alarming, decision support and information services to governments, companies and the general public.

The **UrbanFlood** project investigated the use of sensors within flood embankments to support an online early warning system, real time emergency management and routine asset management. The project also tested the remote monitoring of dikes and floods from nearby offices or from other countries and continents through secure use of web based technologies.

UrbanFlood

UrbanFlood took part in the final IJkdijk experiment in Bellingwolde (the Netherlands). In this "All-In-One Sensor Validation Test" the failure mechanism collapsed and the UrbanFlood system was able to predict the two dike breaches well in advance.

http://www.urbanflood.eu/

Funded by the Seventh Framework Programme (FP7)
Duration: 2009 – 2012

Reducing the energy consumption of Data Centres

In the era of information and data deluge, data centres play an increasingly critical role in every aspect of our socio-economic activity. While there is an insatiable need for more computation and storage power, the energy consumption in data centres poses an "energy wall" that must be addressed to be able to advance to more powerful data centres. Moreover experience has shown that up to now only a holistic approach leads to the most efficient and sustainable solutions. This starts from the decision on the data centres location all the way up to the technologies used in the various systems, and the reuse of the heat that is produced by them.

The **Games** and **FIT4GREEN** projects are two ongoing initiatives on energy efficiency for data centres exploring two different approaches.

GAMES aims at developing innovative methodologies for individual Green, Real-Time and Energy-aware IT Service Centres. A Green IT Service Centre is an infrastructure for executing business services and a repository for the storage, management, and dissemination of data in which the mechanical, lighting, electrical and computer systems are designed for maximum energy efficiency and minimum environmental impact. Thanks to its holistic approach, GAMES is expected to increase energy efficiency in data centres by up to 25%.

GAMES

The project will adopt an innovative approach taking into account the interrelations between different layers (business/applications, infrastructure, facility) and their effect on energy consumption.

It will deliver a methodology and toolset for the holistic design and operations monitoring of green IT service centres, trading-off Quality of Service, performance, virtual and physical resource allocation and overall energy efficiency.

http://www.green-datacenters.eu/

Funded by the Seventh Framework Programme (FP7)
Duration: 2010 – 2012

The **FIT4GREEN** project applies power optimization by spreading load across multiple data centres. It enhances existing deployment strategies by moving computation and services around a federation of data centres sites. The project expects to provide at least 20% saving in the energy consumption of servers and network devices in comparison with a traditionally managed data centre and an additional 30% saving due to reduced cooling needs.

FIT4GREEN

The project aims to save energy in data centres, and works with existing logistics. It has been designed to work for any data centre, Computing style, Monitoring and Automation frameworks, and also federated data centres.

The project dynamically tunes the amount of computing resources to the workload, and then unused servers are turned off and automatically restarted when load increases.

http://www.fit4green.eu

Funded by the Seventh Framework Programme (FP7)
Duration: 2010 – 2012

Electronic waste: a new challenge

ICT related waste is becoming an issue in a digital society where each citizen produces 17 kg of electric and electronic equipment waste annually.

Digital technologies can make the management of waste streams more efficient. ICT design tools to optimise logistics and electronic tagging of materials are promising research areas that will allow to recover precious materials and detect illegal shipments or unauthorised treatment of waste.

Europe's strong position in the global recycling market can be a source of competitiveness and growth given our reliance on imports of scarce "high-tech" metals. In the coming years, new projects can be envisaged to complement the European Innovation Partnership on Raw Materials.

Smart, green transport

Transport is a leading force of Europe's competitiveness and growth, and it represents 12.3% of the EU workforce. However, the transport sector is also a major contributor to greenhouse gas emissions and other air pollutants and it still almost entirely depends on fossil fuels.

ICT and ITS (Intelligent Transport Systems) research is helping move transport towards sustainability by making cars cleaner and less energy consuming, by improving traffic management or by making public transport more accessible, efficient and reliable. Some applications and services called cooperative systems will soon allow vehicles to "talk" to each other and communicate with the road-side infrastructure. This will help prevent crashes, increase the flow of urban traffic and reduce emergency services' response time in case of an accident.

ITS applications can also facilitate intermodal transport and rationalise private and freight transport by enabling, for instance, the pre-booking of parking spaces or slots at the loading ramp.

In order to reap all these benefits for the road users and the economy, the European Union shows strong political will to bring Intelligent Transport Systems to the roads. The most important manifestations of this will are the **ITS Directive and the ITS Action Plan** as well as – with a focus on urban mobility – the recent Communication on Smart Cities and Communities.

Smart mobility solutions

Human error is involved in 95% of all traffic accidents on Europe's roads. More than 30 000 people are killed and 1.5 million injured in them every year. Road transport also burns one quarter of the European Union's overall energy consumption, with one fifth of the EU's CO_2 emissions caused by road vehicles. Intelligent Transport Systems, which are based on the powers of sensors, computers and telecom, can make a major difference to these figures.

A case in point is the European eCall service. It will save lives by having the car automatically dial 112 – the Europe-wide emergency number – in case of a serious accident, thus dramatically accelerating the arrival of the rescue teams. The call informs the emergency call centre about the crash, even if all vehicle occupants are unconscious, and transmits a set of relevant data, including the exact location of the crash site. eCall is to be introduced as of 2015 in all new models of passenger cars and light-duty vehicles, and will be supported across the EU as well as in Iceland, Norway, Switzerland and Turkey.

Thanks to stand-alone and cooperative systems, living in a city with improved safety for all road users, reduced traffic jams and shorter and more predictable journey times, is possible. These systems sense the car's environment and assist the driver in his driving task or wirelessly "talk" to each other, the immediate road-side infrastructure or the wider transport management centres. Covering stand-alone and cooperative systems, euroFOT on the one hand and CVIS, SAFESPOT and DRIVE C2X on the other are complementary projects.

euroFOT's objective was to test eight close-to-the-market stand-alone driver assistance systems. Thanks to the project, anyone involved in decisions on motorised road transport, including the car buyer, can now make better informed decisions on driver assistance systems.

euroFOT

euroFOT coordinated the testing under real traffic conditions of eight mature systems assisting the driver in his/her driving task. euroFOT tested systems embedded in the vehicle, such as Forward Collision Warning or Adaptive Cruise Control, are stand-alone systems which need not communicate with e.g. other cars. The project aimed to measure the impact of these systems on road safety, mobility, driver behaviour and the environment. The impact was assessed through a comprehensive technical and socio-economic evaluation programme that involved both passenger cars and trucks.

http://www.eurofot-ip.eu

Funded by the Seventh Framework Programme (FP7)
Duration: 2008 - 2012

In contrast to euroFOT, **CVIS project's** ambition was to begin a revolution in mobility by creating a system allowing vehicles to communicate with the immediate road-side infrastructure. This means, for instance, that traffic light controllers in "smart cities" adapt green waves to the number of approaching vehicles, or that the wider transport infrastructure, such as network management centres, enable a wide range of cooperative services to run on an open application framework (including on smartphones). At test sites in six different European countries, CVIS tested cooperative reference applications for freight, fleet and public transport management. Although CVIS terminated already some years ago, its achievements live on, for instance in the current FREILOT innovation project or in the recently kicked-off research project Compass4D.

CVIS (Cooperative Vehicle-Infrastructure Systems)

CVIS developed and tested at six test sites across Europe a number of cooperative applications: a router capable of maintaining a continuous internet connection over a wide range of media, techniques for enhanced vehicle positioning and the creation of local dynamic maps, improved data sharing between vehicles, roadside infrastructure and other service centres. Its technological solutions are now used in project eCoMove (see below) funded by Seventh Framework Programme.

http://www.cvisproject.org

Funded by the Sixth Framework Programme (FP6)
Duration: 2006 – 2010

The growing mobility of people and goods implies very high social costs in terms of fatalities and injured people. **SAFESPOT** developed a cooperative solution called Safety Margin Assistant that detects potentially dangerous situations and extends drivers' awareness of the surroundings. This higher awareness of the vehicle's immediate environment gives the driver more time to react to dangerous conditions and thus helps avoid or mitigate accidents and increase road safety. The results achieved by SAFESPOT have been used in several follow-up projects.

SAFESPOT

SAFESPOT developed many solutions that can prevent accidents on intersections, help to overtake safely in urban and semi-urban roads, warn against head on, rear end and frontal collisions, inform about road conditions.

Applications were tested in Italy, France, Spain, Germany, Sweden and The Netherlands. Its technological solutions are now used in project eCoMove funded by Seventh Framework Programme.

http://www.safespot-eu.org/

Funded by the Sixth Framework Programme (FP6)
Duration: 2006 – 2010

DRIVE C2X is also working on cooperative systems. The objective of the DRIVE C2X project is to carry out comprehensive assessment of cooperative systems through tests under real traffic conditions (Field Operational Tests) in various places in Europe. The tests' goal is to verify, compare and prioritize the benefits of different cooperative systems and thus to pave the way for knowledge-based market implementation. DRIVE C2X is focusing on comparable test results in order to enable better informed decisions of drivers, carmakers or public authorities. To show the benefits of cooperative mobility in practice, DRIVE C2X will run a test site campaign called "Making cooperative systems cooperate".

With a particular focus on cooperative systems, the European Commission cooperates with the USA and Japan in the field of Intelligent Transport Systems (ITS) with the aim to develop global standards that harmonise the way cars communicate with each other and the infrastructure.

DRIVE C2X

DRIVE C2X develops a reference framework for the testing of cooperative systems. The term 'cooperative' refers to systems by which cars 'talk' to each other or to road-side installations such as traffic lights. DRIVE C2X' framework ensures that the results of tests carried out in different places and at different times will be comparable. In the end, DRIVE C2X will thus contribute to the safety, efficiency and environmental acceptability of road traffic.

http://www.drive-c2x.eu

Funded by the Seventh Framework Programme (FP7)
Duration: 2011 – 2013

Greener transport

Cooperative systems can also help transport to reduce its environmental impact. Project **eCoMove** is based on the idea that there is a minimum energy consumption that can be achieved by the perfect eco-driver using a perfectly eco-managed road network. eCoMove will come up with an integrated solution for road transport's energy efficiency. It develops systems and tools that help drivers sustainably eliminate wasteful fuel consumption (and thus CO_2 emissions), and road operators to manage traffic in the most efficient way.

Taking into account that 73% of all petrol consumed in Europe is today burnt by transport, the introduction of electric vehicles is urgent. However, in order to buy and use electric cars, customers need to be free from "range anxiety", i.e. the fear to get stranded because the car runs out of battery power. The rationale of the **ELVIRE** project is therefore to contribute significantly to neutralizing drivers' range anxiety and encourage customers to take up electric road vehicles.
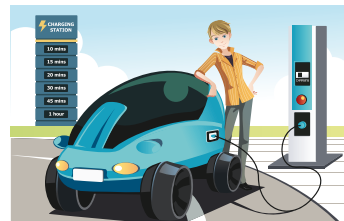
Innovative online public services in an inclusive and reflective society

Effective interaction between public administrations, citizens and businesses is essential to build the digital society. Online delivery of basic services to citizens (e.g. personal documents and certificates, income taxes and job search tools) and businesses (e.g. company registration, social contributions, corporate tax, VAT) help public authorities to meet people's needs.

In times of crisis, governments need to operate more efficiently and ensure a smooth connection with citizens and businesses. Innovation in the delivery of online public services in essential to keep this sector, representing almost 50% of the GDP and about 17% of employment, competitive. At the same time, investment in innovation in the public services pays back: eGovernment can reduce the costs of administration by 15-20%.

Europe is already doing well in this field: today, 41% of EU citizens and 84% of businesses use online public services and more than 82% of public services are on average fully available online. While the "passive" use (e.g. reading information) of public authorities' websites has remained pretty stable over the past years, there has been a steady increase in the "interactive" use of these services, such as the downloading of official forms and returning completed forms. However, we need to ensure that administrations and people can fully interact digitally and that the users are the centre of the public services creation and delivery. Also, most public services do not work across borders, and specific needs, such as services for online registration of new companies or getting the unemployment rights, are not yet fully met.

Innovation in public services includes the widespread use of technologies that make knowledge available to all and help protect and open up the European cultural heritage. ICT can enable access to the European cultural heritage in digital libraries, archives and museums for leisure, study and commercial purposes.

Yet, despite the on-going innovation in many areas of the public services, one of the biggest challenges is to ensure that innovative solutions are accessible to all. In 2011, 38 million household were not yet online and the lack of digital skills is a serious concern. The risk of "digital exclusion" affects in particular the disadvantaged societal groups: elderly; low income; the unemployed; the less educated and the disabled. To ensure that disadvantaged groups equally benefit from the digital society we have to increase digital skills on one hand, and the accessibility of technologies on the other.

The Digital Agenda for Europe is responding to these challenges and sets specific targets and actions to improve the online public services, to preserve the European cultural heritage and to tackle the digital divide among different groups of the society.

On the first front, the **e-Government Action Plan** is dedicated to **effective online public services**. The objective is to empower users to actively contribute to the production of eGovernment services or even policy-making. This will influence public administrations to become more open, transparent and accountable. The Action Plan also proposes measures so that citizens and businesses can benefit from on-line services in other EU Member States as easily as they do at home, and increase the overall usage. Concrete goals include the registration of data with governments only once, the EU-wide use of national electronic identities (eID), the personalisation of services to better respond to users' needs and the promotion of more open, proactive and transparent administrations.

The eGovernment Action Plan asks Member States to formally agree on a common list of key cross-border public services and implement seamless cross-border e-Government services in the EU single market. The ultimate goal is to make it easier for companies to set up and run a business, and for citizens to study, work, reside and retire anywhere in the EU. Key to this strategy is the development of **large scale pilot projects (LSP)**. These bring together public authorities, service providers and research centres across the EU in the implementation of common solutions to deliver online public services that are accessible throughout Europe.

To secure preservation and widespread accessibility of the European cultural heritage, the Digital Agenda for Europe (DAE) supports the growth and consolidation of **Europeana**, Europe's digital library, archive and museum. The project started in 2008 with 2 million items and it currently holds more than 24 million objects. In 2011 the European Commission adopted a **Recommendation on digitisation and**

digital preservation asking EU Member States to step up their efforts to make European cultural heritage more widely available and to boost growth in Europe's creative industries.

To tackle the digital divide, the Digital Agenda for Europe set targets until 2015: halving the proportion of population that has never used the internet (to 15%), increasing regular internet use from 60% to 75% for the general population and from 41.5% to 60% for disadvantaged people. This also requires that public sector websites are fully accessible by 2015. Therefore at the end of 2012 the European Commission adopted a proposal for a Directive on the accessibility of the public sector bodies' websites and is now engaging with the European Parliament, the governments, the industry and organisations to speed up the adoption and implementation of the Directive. 80 million citizens with disabilities in addition to 87 million of those above 65 would benefit once this proposal is adopted and implemented. For instance, visually impaired people will be able to hear descriptions of images and the hearing impaired will see written captions for audio files and all parts of a website could be explored via keyboards as well as a computer mouse.

Last but not least, the digital economy is borderless by nature, but the European Digital Single Market has remained fragmented and is characterised by different national market practices. Europe could gain EUR 500 billion by fully developing the Digital Single Market by 2020, increasing its GDP by an extra 4%. Eliminating the remaining obstacles is in the core of the Digital Agenda for Europe, including proposals to reuse of public sector information, electronic identification and e-signatures or on collective rights management.

To achieve digital transformation in public services and make it available to all Europeans, the Commission envisages deploying and rolling out digital services in key areas of public interest and support cross border interoperability of eIDs, e-procurement, e-Justice or electronic health records, just to give few concrete examples.

Cross-border public services for an easier life

In many European countries, citizens have identity cards and use them when interacting with public authorities. Electronic identification (eID) schemes can make these interactions much simpler for citizens and more cost-effective for administrations.

However, most online public services do not work across borders, or else involve heavy procedures. A citizen from one EU country cannot easily apply for public services in another, using the national electronic identification. This reduces the mobility of citizens and businesses, and hampers the development of the Digital Single Market.

Interoperability refers to the possibility of different systems and organisations to cooperate and exchange information electronically. It is central in the DAE strategy for public services, which highlights the importance of ICT-based solutions to, for example, enrol in higher education, register a car and participate in a public tender throughout Europe.

Building on existing national electronic public services, the **STORK** (2008-2011) and **STORK 2.0** projects aim to have them accessible across borders through users' electronic identities. STORK has developed a European Electronic Identity (eID) Interoperability Platform allowing citizens to use their national electronic identities to access public eGovernment services in other Member States, in full respect of data protection and privacy rules.

The solution has been tested in many countries on more than 20 applications. The project STORK 2.0 now aims to expand the identification services to legal entities, representatives and mandates, as well as to explore the uptake of STORK solutions in private sector applications.

STORK

The projects implement:

- Cross-border authentication for online public services via eIDs;
- Cross-border safer Chat application ;
- Student Mobility;
- Cross-border eDelivery;
- Change of Address;
- Citizen identification and authentication to access EC applications via national eIDs.

STORK 2.0

- Cross-border eID services in real life settings (pilots in eLearning and Academic Qualifications, eBanking, Public Services for Businesses and eHealth).

http://www.eid-stork2.eu/

Funded by the ICT Policy Support Programme (ICT PSP) – Competitiveness & Innovation Programme (CIP)
Duration: 2012-2015

[eProcurement](#) is one of the high impact services, as alone it can help save 100 billion per year and it shows the potential to represent an important portion of Europe's economy: the overall market for purchases of goods, services and works by the EU public sector is estimated to be almost 20% of EU GDP (2010 figures). An increase in trans-EU eProcurement serves the goal of a digital single market, it can make Europe more competitive especially for SMEs, and it offers substantial efficiency gains.

Companies, especially small firms, often find it difficult to access public procurement. Moreover, while many EU countries are using electronic procurement (eProcurement) to make bidding for public sector contracts, these solutions are often implemented as isolated islands within Member States.

The **PEPPOL** project focused on making cross-border e-procurement easier and more efficient by improving electronic communication between companies and government bodies. PEPPOL is an important step towards fully achieving the **[Single European Market](#)**. For example, the project has developed an interoperability solution to support the exchange of evidence across borders. Also called 'Virtual Company Dossier', this eAttestation tool developed a standardised structure to submit evidences both in the tendering process and under existing contracts. The project officially ended in August 2012 but the project partners regarded the results to be so valuable that they decided to transfer them into the OpenPEPPOL Association. It gathers public and private members of the PEPPOL community, takintg over responsibilities for PEPPOL specifications, building blocks and services and promoting implementation across Europe.

PEPPOL and OpenPEPPOL

The PEPPOL project allows any company in the EU to communicate electronically with any EU governmental institution to fulfil procurement procedures. This can result in significant benefits for SMEs, as well as EU governments at every level which will enjoy reduced costs through automated and simplified processes and more competition in bids. Electronic processes also ensure transparency and better control of funding, as well as the possibility of facilitating sustainable procurement.

http://www.peppol.eu/about_peppol/openpeppol

Funded by the ICT Policy Support Programme (ICT PSP) – Competitiveness & Innovation Programme (CIP)
Duration: 2008-2012

The *European services sector* accounts for 75% of the EU's GDP and employment, and the 4.4 million firms in this sector generate 95% of all new jobs. Benefiting from the results of PEPPOL and the STORK Large Scale Pilot, **SPOCS** aimed to build the next generation of Points of Single Contact (PSCs) – intermediaries between services

providers and national public administrations as foreseen in the Internal Market Services Directive. The Points of Single Contact are "one-stop shops" that fulfil two main functions: information dissemination and online completion of administrative procedures. However, there is still a limited availability of online procedures and the interoperability between national eGovernment services is poor. In this context, SPOCS has been aiming to take down barriers to cross-border business and to make life easier for entrepreneurs, especially those who want to expand their businesses abroad. It was doing so by providing seamless electronic procedures by enhancing cross-border interoperability. The project was expected to foster competitiveness, increase efficiency and reduce the administrative burden in a more transparent and user-friendly way.

SPOCS

SPOCS addresses:

- User identification and authentication;
- Provision of supporting electronic documents;
- Syndication of data and eDirectories;
- A Secure delivery and data tracking exchanges.

http://www.eu-spocs.eu

Funded by the ICT Policy Support Programme (ICT PSP) – Competitiveness & Innovation Programme (CIP)
Duration: 2009-2012

Improving interoperability between legal authorities and thus making justice faster is at the heart of the **e-CODEX** project. It seeks to improve access of citizens and businesses to the judicial system of other countries in Europe, linking the national judicial systems to the European e-Justice portal and building a One-Stop-Shop for e-justice. The project will pilot the technical solutions developed in four application areas: small claims procedures, the European Payment Order procedure, exchange of sensitive documents and the European Arrest Warrant. Claims for lost luggage, speeding fines, filling and submitting forms to courts in different countries: the opportunity to process this online, in their national language, is a concrete example of e-Justice for citizens.

To consolidate the work of different large scale pilot projects, to industrialise the solutions and to extend their potential to more domains, the European Commission is preparing the new pilot e-SENS (foreseen to start in 2013). It will focus on providing a set of Basic Cross Sector Services, ready for reuse, in key areas such as health, public procurement, services and justice, including a common eID management as well as other building blocks such as eDelivery, virtual company dossier and similar.

Citizens on the move

More than 12.3 million Europeans have moved to live and work in a different country. Effective transmission of individual data between national authorities must therefore be a priority. The **European Civil Registry Network** project **(ECRN)** allowed EU Member States' local administrations to exchange civil status acts (birth, death, marriage, divorce etc.) in electronic form via internet in a fast, secure and certified way. The project has established a close collaboration with the STORK project on the recognition of electronic identity for anyone accessing the services network. Active participation in political life and decision-making

Active participation
in political life and decision-making

Is participation in politics and decision making still something which is limited to a few groups? Thanks to ICT – particularly social media – more and more citizens are able to take direct part in political debate. However, the information and resources that governments and public administrations make available to citizens can be difficult to understand. This leads to a sense of detachment and disillusionment towards public bodies and the democratic process itself.

The better we understand our rights as EU citizens, the more informed the decisions we can take and the more we can contribute to the democratic life with our engaged contributions. With this aim in mind, the European Commission decided that 2013 should be the **European Year of Citizens**. Also, the **Europe for Citizens Programme** (2007–2013) promotes initiatives that facilitate the active participation in the civic and democratic life of the EU.

The projects presented here aim to enable participatory, transparent and inclusive policy making and more democratic public life.

The **Puzzled by Policy** project provides citizens with a unique online platform to learn about the EU and find out which specific policies are relevant to them at national level. The project addresses immigration, giving users the opportunity to contribute to policy drafting and impact assessment. To ensure wide accessibility, the platform widget is available also on social media channels and mobile devices.

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In a similar vein, the **ImmigrationPolicy 2.0** project uses state-of-the-art ICT technologies (including Web 2.0 and social networking) to pilot a range of citizen-centred services (e.g. searchable inventories on national migration policies and related legislation). The key objective is to facilitate citizens' involvement in immigration policy development, granting access to policy information and enabling them to express their views. At the same time, the project supports the harmonisation of immigration policies and actions across the EU, providing public administrators, politicians and decision makers with input for the preparation of immigration policy texts, the development and testing of policy models and the evaluation of possible scenarios.

As a response to very low turnout of young people in elections, including the European elections, <u>OurSpace</u> (2010-2013) seeks to promote the active involvement of young people in the process of decision-making through the use of ICT. It provides a Social Networking space "Ourspace" where young Europeans can express their thoughts on politics, society, economy and debate them with politicians and peers across Europe. The results will be communicated to the relevant public administration bodies, national committees and eventually relevant EU institutions responsible for youth affairs aiming to influence the decision-making and policy process.

Moving public services to the Cloud

Public administration are often organised in silos: monolithic architecture models make it difficult to re-use services for the development of new applications. What if these services were connected and the access to information open? The European Commission is currently testing the potential of a Cloud of public services for the development and the delivery of more flexible public services by combining building blocks and allowing service sharing between public and private providers. Ultimately the citizens should benefit from more personalised public services, provided also by third-party actors using public information. In turn, public administrations experience savings and increased flexibility in services design and provision.

Four projects started early 2012.

The **InGeoCLOUDS** project (2012-2014) focuses on seamless access to geospatial information, integrates and connects existing datasets and moves them to the Cloud. In addition, the project plans to demonstrate the ability to build more intelligent services by seamlessly using and combining integrated data through the Cloud.

The **Open-DAI** project (2012-2014) will test the efficiency and added value of Service Oriented Architecture (SOA) and Cloud-based architecture on several public administrations. It will assess the business benefits for both public and private organizations of developing new collaborative services in areas such as transport and mobility, localization and geographic information, and environment and pollution. http://www.open-dai.eu/

Similarly, the **eEnviPer** project (2012-2014) will integrate relevant processes and data collected by public authorities and agencies. It will allow them to model and deploy services, as part of a Cloud of e-Government services that supports the granting of environmental licensing procedures to citizens and businesses. At the same time it supports public participation, consultation and transparency in policy making. http://www.eenviper.eu/

In many cases, citizens and businesses find it difficult or impossible to find information or access services provided by local public authorities on the internet. Information is often segmented and not-user friendly.

The **OASIS** project (2012-2015) will facilitate this search by grouping online services in a unified portal, using cloud architecture and following a user-centric approach. It will also help public administrations to make better use of customer and businesses information and better adapt public e-services to the needs of people and businesses. The project is thus seeking to make services more accessible, user-friendly, efficient and less expensive for the taxpayer.
http://www.oasis-eu.org

European cultural heritage at hand and preservation of digital memory

The pervasiveness of digital technologies in the everyday life is changing the way citizens, especially young digital natives, expect to access cultural content. The cultural institutions, such as museums and galleries are looking at more attractive solutions to offer their visitors more interactive and engaging experiences. This could be done, for example, by capitalising on the resources available in recently developed digital libraries.

The **CHESS** project (Cultural Heritage Experiences through Socio-personal interactions and Storytelling) is developing an innovative conceptual and technological framework to enable cultural content providers and visitors to build personalised and narrative experiences linked to the cultural heritage and adapted to the visitor's profiles. Essentially, CHESS proposes to create narrative-driven cultural "adventures" through hybrid structures, which adapt continuously to their visitors, extend over space and time, and involve multiple users with different interfaces.

To do so, it integrates interdisciplinary research in personalization, digital storytelling, interaction methodologies, narrative-oriented mobile and mixed reality technologies, with a sound theoretical basis in museology, cognitive, and learning sciences.

The CHESS system has been displayed at two world-renowned museums, the New Acropolis Museum, and the Cité de l'Espace in France.

The **V-City** project focused on the reconstruction and interactive 3D visualisation of massive and highly detailed urban environments, acknowledged by the UNESCO as one of the most important part the cultural heritage. It developed and validated a complete system enabling historians, architects or archaeologists to reconstruct urban environments using an innovative interactive 3D user interface.

The *V-CITY* products are now commercially available worldwide: **VirtualGeo** is now a widely adopted product to create and interactively visualize massive 3D geographic environments with more than 120,000 users in November 2012 and with an estimation to reach one million by the end of 2013; **CityEngine**, which transforms 2D GIS data into smart 3D city models, is also enjoying a successful experience in the market and **iLight** is the first multi-user multitouch stereo table available on the market.

Another example of how ICT can help us in preserving the cultural heritage comes from the domain of cinema. The **EFG1914** project digitises films and non-film material related to the World War I. The project cooperates with 20 European archives in 15 countries to gather the material to be digitised.

The constant production of digital content poses an issue of preservation. As we need to make sure that physical cultural collections survive the damages and the natural decline that comes with the time, we have to act to preserve digital content. The speed and the easiness in the production and storage of this content, in fact, go hand in hand with a relatively short lifespan of that information. Many organisations including national archives and libraries are now facing the issue of providing an enduring access to our digital and scientific heritage.

The **PLANETS** project brought together memory institutions, small businesses, major technology providers and research institutions from across Europe to build practical services and tools to help ensure long-term access to digital content. After completion, the project established the non-profit **Open Planets Foundation** to provide the digital preservation community with services, on-going support, and a sustainable future for its Open Source results.

The project was awarded the Digital Preservation Award for Research and Innovation 2012 by the Digital Preservation Coalition (UK).

Living in inclusive society

Building an inclusive society implies that people that are usually marginalized get opportunities to better communicate, interact and integrate with the external environment.

Digital technologies such as serious games can for example help to overcome marginalisation of the young by using the ICT tools youngsters are most familiar with: videogames. Serious games simulate real situations and processes with the aim of solving a problem, for example antisocial behaviour. They offer the advantages of repeatable experiences such as stress in social situations, experienced by the user in real life.

The **TARDIS** project seeks to help the youngsters not in Employment, Education or Training (NEET) who are at risk of social exclusion. The aim is to develop a simulation platform based on serious game simulation techniques applied to the job interviews scenarios. Both users and field practitioners can benefit from this solution in terms of personalised simulations and support for more flexible and situation-based coaching practices.

People with autism face serious problems in integrating with society as they find it difficult to recognise emotions and mental states through the classic communication forms (verbal and body language). ICT can offer innovative and less expensive solutions to train people with autism.

The **ASC-Inclusion** project aims to assist children with autism to recognise, understand and express emotions through facial expressions, voice and body gestures through interactive games.

ASC-Inclusion

The projects develops an online virtual world platform consisting of three subsystems:

- Facial expressions
- Vocal intonation
- Body gestures

These systems will analyse children's behaviour and train them to recognise theirs and others' verbal and non-verbal communication.

http://asc-inclusion.eu/

Funded by the Seventh Framework Programme (FP7)
Duration: 2011-2014

ICT can help disadvantaged people to stay involved in the society. At the same time, ICT itself can represent a barrier for those who are missing the necessary skills or need personalised features to access technology. Services such as eGovernment, eHealth, eCulture and eCommerce cannot be enjoyed by all if the technology is not accessible.

Everyday actions, such as withdrawing money from a bank terminal or buying a ticket for a public transport service, can become a burden for disabled people, the elderly or anybody who is not familiar with public digital terminals (PDTs).

The **APSIS4ALL** project (Accessible Personalised Services in Public Digital Terminals for All) works towards full accessibility of public digital terminals, such as Automated Teller Machines (ATMs) and Ticket Vending Machines (TVMs). It also overcomes the existing accessibility barriers faced by people unfamiliar with ICT, people with disabilities and older people when interacting with Public Digital Terminals.

APSIS4all will increase user satisfaction, regardless of disability, age or digital literacy, by providing new, customised interaction modes, including adaptive interfaces and interaction through the user's mobile, thus offering users a truly personalised service adapted to their needs and preferences.

The system is expected to be ready for use in some ATM in Spain and TVM in Germany by 2014.

APSIS4ALL

The project proposes a system based on 2 types of interaction:

- Direct: when interacting with a PDT, the user only needs to bring a contactless card where his preferences are stored, so that the interface is automatically customized to his needs.
- Indirect: the user can customize his preferences and store them in their own device (accessible smartphone or smartcard) that are transmitted to the PDT (e.g. via a 2D code) when on site.

http://www.apsis4all.eu/

Funded by the ICT Policy Support Programme (ICT PSP) – Competitiveness & Innovation Programme (CIP)
Duration: 2011–2014

In the same area, the **CLOUD4ALL** project uses cloud technologies to make mainstream products and services accessible for all. The final aim is to allow people who have difficulties in managing digital technologies to perform basic to complex operations such as applying for jobs online or using eLearning applications. The cloud helps the users to store their preferences and activate them in any moment and it grants them the automatic personalisation according to their profiles when they try to access digital products and services.

CLOUD4ALL

The projects is developing a solution to match the user's preferences and accessibility features, set in his profile and stored either locally or in the cloud, with mainstream products and services. The use of cloud-based assistive technology will enable the user to adapt the digital product and services to his access preferences anywhere, on any device (PC, mobile, smart phone, iTV).

http://www.cloud4all.info/

Funded by the Seventh Framework Programme (FP7)
Duration: 2011-2015

Living in a secure society

The concern for security is as old as humankind. What is "new" is its extension to our digital environment. Indeed, our economy and society are now highly dependent on Information and Communication Technology (ICT). We have grown accustomed to the

benefits brought by the Internet, smartphones, and the visible and invisible computing power around us. ICT services and devices have become an integral part of our way of life, and even of our culture.

The **Digital Agenda for Europe** (DAE) recognises that the Internet has proved to be remarkably secure, resilient and stable. However, the extensive usage of ICT brings not only benefits but also carries risks. Only 12% of European web users feel completely safe making online transactions. 38% of users had concerns with the safety of online payments and have changed their behaviour because of concerns with security issues: 18% are less likely to buy goods online and 15% are less likely to use online banking. IT networks and end users' terminals still remain vulnerable to a wide range of evolving threats (lack of privacy, loss of data, malfunctioning of the network due to a cyber-attack). Therefore, the DAE has defined a number of objectives in the field of trust and security:

- *security of networks* – the internet has become a critical information infrastructure, encompassing IT systems and networks across the globe. It must be resilient and secure against all sorts of threats. Strong cooperation between EU governments, public bodies and private companies is necessary to improve information exchange and to ensure that security problems are addressed quickly and effectively. The **European Network Information and Security Agency (ENISA)** serves as a focal point for this exchange and cooperation. To react to threats in real-time conditions, the European Commission will establish a network of **Computer Emergency Response Teams** (CERTs), also for European institutions (**CERT-EU**).

- *fight against cybercrime and cyber-attacks* – attacks against information systems are a growing threat, and there is an increasing concern about the potential for terrorist or politically motivated attacks against information systems which form part of the critical infrastructures of Member States and the Union. The **Cybersecurity Strategy for the European Union** gives

incentives aiming at making the EU's online environment the most secure in the world. The **European Cybercrime Centre (EC3)** has been created to fight against cybercrime, contributing to faster reactions in the event of online crimes. As network and information systems are globally interconnected, cybersecurity has a global dimension too. The strategy addresses international cooperation as a key priority.

- *trust in technology* – 74% of EU Internet users in 2012 thought that the risk of becoming a victim of cybercrime had increased in the past year. Building citizens' confidence in the digital world needs an EU-wide solution – also because cyber attackers do not respect national borders. A disruption in one EU country can have a knock-on effect in other Member States or the EU as a whole. That is why the European Commission proposed the **Directive on Network and Information Security**, which aim is to strengthen preparedness, cross-border cooperation and information exchange in the EU.

- *safety of children online* – whereas the Digital Agenda for Europe aims to have every European digital, children, who start using Internet from the age of 7, need quality content online to stimulate their imagination and help them learn. But they also need the skills and tools for using the Internet safely and responsibly. A combination of policies is required to deliver a **Better Internet for Children**. The "**Strategy for a Better Internet for Children**" proposes a series of actions to be undertaken by the Commission, Member States and the whole industry value chain.

To meet those objectives and to keep our society secure and provide citizens with the trust in ICT services and devices, on the one hand we need a definition of legal frameworks (like proposed cybersecurity strategy and directive) to protect us from any disruption of, or attack on, our services and devices. On the other hand, we need to invest in research and development of secure, trustworthy and privacy protecting ICT. At the moment, funding in the field is available through **7th Framework Programme** and **Competitiveness and Innovation Framework Programme** (CIP) and in the future, for years 2014-2020, funding will be available through the new EU framework programme for research and innovation, **Horizon 2020**.

Online privacy and electronic identity

While using the Internet you often entrust vital personal information, such as your name, address, and credit card number, to your Internet Service Provider and to the website. As securing these transactions requires strong authentication, electronic authentication tokens and mechanisms have become common.

But what about cases where you don't use tokens? The key challenge is to protect privacy in emerging applications, like collaborative processes, participation in virtual communities or the use of personalised services, maintaining life-long privacy control.

To date, credentials such as digitally signed pieces of personal information or other information used to authenticate or identify a user have not been designed to respect the users' privacy. They reveal the identity of the holder even though the application at hand often needs much less information, for instance only confirmation that the holder is a teenager or is eligible for social benefits. Thanks to Attribute-based Credentials (ABC) a holder reveals just the minimal information required by the application, without giving away full identity information. These credentials thus facilitate the implementation of a trustworthy and, at the same time, privacy-protecting digital society.

The aim of the **ABC4TRUST** project is to deepen the understanding of ABC technologies and enable their efficient and effective deployment in practice. These results will allow stakeholders to better understand privacy-preserving ABC technologies, and compare the relative merits of different technologies in different scenarios.

ABC4TRUST (Attribute-based Credentials for Trust)

ABC4Trust s objective is to:

- define a common, unified architecture for ABC systems to allow comparing their respective features and combining them on common platforms, and
- deliver open reference implementations of selected ABC systems and deploy them in actual production pilots. This will enable provably accredited members of restricted communities to provide anonymous feedback on their community or its members.

https://abc4trust.eu/

Funded by the Seventh Framework Programme (FP7)
Duration: 2010-2014

Electronic Identities (eIDs) are now issued by many European countries and promise a drastic increase in the security and trust of identities on the Internet. Yet, everyday use of eIDs remains low and lags behind original expectations.

The **FutureID** project attempts to change this by building comprehensible, flexible, privacy-aware identity management infrastructure for Europe. It will allow application and service providers to easily integrate their existing services with the FutureID infrastructure, without requiring them to make substantial investments. This will enable service providers to offer this technology to users as an alternative to username/password based systems, with a more trustworthy, usable and innovative technology.

Defending and securing network infrastructures

Trust is the core of social and economic activity in the Internet, and is the basis of economic transactions, social connections, and communication between people and organisations. As we increasingly rely on broadband networks, it is extremely important to make them more secure and trustworthy and protect them against any kind of accidental or deliberate failure.

Over the past decade we have witnessed an ever-increasing amount of *cyber-attacks* on the Internet. Ranging in style from large-scale worms to phishing attempts, cyber-attacks have evolved to unprecedented levels of sophistication. To counter these phenomena, defenders are (mostly) developing safeguards after the attacks are made. We are facing an asymmetrical threat: whilst defenders are busy with mending the fences, attackers have already developed and planned their next strike. Defenders are locked into a vicious cycle: chasing after attackers without ever being able to catch up.

The European Commission contributes to establish the culture of "prevention is better than cure" through **Syssec**, a European 'Network of Excellence' (NoE). The NoE is focused on developing solutions for predicting threats and vulnerabilities before they occur, enabling potential victims of cyber-attacks to build defences before threats materialise. The project has set up a 'Virtual centre of excellence' to consolidate the systems-security research community in Europe and empower collaborative research, and is working on an active research roadmap and a range of cyber-security education initiatives.

Current trends in Internet applications such as Web 2.0, cloud computing, and the **Internet of Things**, are bound to bring more pervasive data collection, longer persistence of collected data, higher and more heterogeneous traffic volume. All these factors make network management an evolving environment that becomes more challenging every day.

The **DEMONS** project seeks to build a novel cooperative network monitoring and mitigation system based on a completely decentralised, application-aware, privacy-preserving, multi-jurisdictional monitoring infrastructure. Such an infrastructure will provide the detection, reporting and mitigation mechanisms needed to combat not only today's threats, but also those of tomorrow. DEMONS's objective is to realise this infrastructure by applying novel approaches making best use of distributed systems technologies and their characteristics, such as the ability to handle a large amount of data. In doing this, the project will put special emphasis on privacy, trust, and legal issues arising from collecting and exporting data across operator domains and multiple jurisdictions. These issues have previously prevented other security solutions from being widely deployed and have therefore rendered them ineffective.

Secure ICT and service infrastructures

Today, tens of millions of users rely on the internet to do business and access a wide variety of applications and services. Examples include *banking transactions, voice over IP, e-government services, e-commerce* and *business-to-business transactions*. Trustworthy applications and service platforms are a prerequisite for the adoption of innovative business models and uptake of services which can contribute to the further development and growth of the European economy.

The **Future Internet** will provide an environment in which a diverse range of services are offered by a diverse range of suppliers. Users are likely to unknowingly invoke underlying services in a dynamic and ad hoc manner. We will see more and more service consumers that mix and match service components depending on attributes such as availability, quality, price and security.

Thus, the applications that end users see may be composed of multiple services from many different providers. The consequence is that the end user may have little guarantee that a particular service or service supplier will actually offer the security claimed.

The **ANIKETOS** project will help to establish and maintain trustworthiness and secure behaviour in a constantly changing service environment. The project is aligning existing and developing new technology, methods, tools and security services.

ANIKETOS will provide methods for analysing, solving, and sharing information on mitigation of new threats and vulnerabilities. A platform will be constructed for creating and maintaining secure and trusted composite services.

ANIKETOS

The project is addressed to all service users, developers and suppliers. It will:

- provide solutions for security engineering and trust management on the Future Internet;
- develop an integral framework to support secure interoperation and manage trustworthiness.

http://www.aniketos.eu/

Threat monitoring and security information sharing

Combating cyber-crime becomes increasingly hard, for multiple reasons:

- Malicious software is designed to defeat today's best practices from technological and economic points of view.
- Organizations are consolidating malicious activities into profitable professional endeavours.

A lot can be gained by exchanging information on vulnerabilities or attacks. However, private sector and national security authorities are reluctant to share information unless they have a system they can fully trust. These limitations have prevented the emergence of an open standard investigation framework for consistent and systematic malware analysis.

In this field, the **WOMBAT** project aimed at providing new means to understand the existing and emerging threats that are targeting the Internet economy and the net citizens. The acquired datasets and knowledge was shared with all interested security actors (ISPs, CERTs, security vendors, etc.), enabling them to make sound security investment decisions and to focus on the most dangerous activities first. Special care was devoted to impact the level of confidence of the European citizens in the net economy by leveraging computer security awareness in Europe. The Wombat results are now being successfully used in a number of applications and have given rise to additional international research and development activities.

Wombat

The project concentrated on:

- real time gathering of a diverse set of security related raw data
- enrichment of this input by means of various analysis techniques, and
- root cause identification and understanding of the phenomena under scrutiny

http://www.wombat-project.eu/

Funded by the Seventh Framework Programme (FP7)
Duration: 2008-2011

Botnets currently pose the biggest threat to the Internet. A botnet, also known as "zombie army", is a number of Internet computers that, although their owners are unaware of it, have been set up to forward transmissions (including spam or viruses) to other computers on the Internet. The **ACDC (Advanced Cyber Defence Centre)** project combines all European forces from all involved stakeholder groups and Member States to reach a strong and sustainable position for fighting back the botnet threat. The project addresses the identification, measurement, and analysis of botnets as well as the prevention, detection, mitigation, recovery, and evaluation of their impact. ACDC will enable Europeans not only to better identify and shut down command and control servers, but also to eliminate the actual weapons of a botnet – the bots.

ACDC

ACDC proposes end-to-end approach, from detection to protection, manifested as five powerful services, operated by Member States:

1) Service n°1 Centralized clearing house, a single point of contact for data storage and analysis.

2) Service n°2 Support centre delivers structured information for stakeholders and affected end users, likewise.

3) Service n°3 focuses on the detection and mitigation of infected websites,

4) Service n°4 detects network anomalies, including possible cloud- or mobile-based botnets.

5) Service n°5 aims at the integration of tools for identification and removal of malware (e.g., bots) from end user devices.

Funded by Competitiveness and Innovation Programme (CIP)
Duration: 2012-2015

Useful sources

Digital Agenda for Europe
https://ec.europa.eu/digital-agenda
https://www.facebook.com/?ref=tn_tnmn#!/DigitalAgenda
@DigitalAgendaEU
@NeelieKroesEU

Europe 2020: A strategy for smart, sustainable and inclusive growth
http://ec.europa.eu/europe2020/

Horizon 2020
http://ec.europa.eu/research/horizon2020/index_en.cfm?pg=h2020

Competitiveness and Innovation Programme (CIP)
http://ec.europa.eu/cip/

Seventh Framework Programme for R&D (FP7)
http://cordis.europa.eu/fp7

Sixth Framework Programme for R&D (FP6)
http://ec.europa.eu/research/fp6

European Innovation Partnership on Active and Healthy Ageing
http://ec.europa.eu/active-healthy-ageing
@ActiveHealthyAgeing

Health and Well being
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http://www.enisa.europa.eu/
📧 @EU_TrustSec

Smart Cities and Sustainability
https://ec.europa.eu/digital-agenda/node/1100
📧 @EU_ICT4Cities

Living Online
http://ec.europa.eu/digital-agenda/living-online

Cultural Heritage
https://ec.europa.eu/digital-agenda/en/creativity-media/cultural-heritage

For further information:
cnect-h@ec.europa.eu

Index of projects and websites

@qua
http://www.a-qua.eu/

ABC4TRUST
https://abc4trust.eu/

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FutureID
http://FutureID.eu

GAMES
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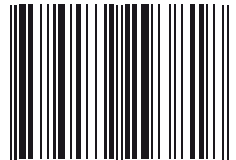
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ICT for Societal Challenges

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