

CETIC PROJECT PORTFOLIO 2013

	ACRONYM	TITLE	APPLICATION DOMAIN	COLLABORATION
1	CE-IQS	Centre of Expertise in Engineering and Quality of Systems	ICT	Wallonia
2	CELLaVI	Center of Expertise in Open Source Software	ICT	Wallonia
3	goCloud	Helping SMEs go to the Cloud	ICT	Wallonia
4	QualIHM	A Requirement Engineering Toolkit for Efficient User Interface Design	ICT	Wallonia
5	PaaSage	Model-Based Cloud Platform Upperware	ICT	Europe
6	POLCA	Programming Large Scale Heterogeneous Infrastructures	ICT	Europe
7	DeciWeb	Taking better decisions with Web data	ICT	Wallonia
8	NAPLES	New Agile Platform for a Lifelong Engineering of Software	ICT	Wallonia
9	CALiPro	Automated configuration of software product lines	ICT	Wallonia
10	eHealth for Citizens	ICT serving patients	Health	Wallonia
11	e-Patch	Development of an Electronic Patch for Geolocation and Fall Detection of People with Mental Deterioration	Health	Wallonia
12	DapCare	Patient Dosimetry eBook	Health	Wallonia
13	SPES	Support Patients through E-Service Solutions	Health	Europe
14	PIPAS	Adaptative Piloting of Hospital Processes	Health	Wallonia
15	AMACS	Automatic Monitoring of Activities Using Contactless Sensors	Health	Europe
16	PONTE	Efficient Patient Recruitment for Innovative Clinical Trials of Existing Drugs to other Indications	Health	Europe
17	NweRIDE	North West Europe Dynamic Ridesharing	Transport	Europe
18	Numerical	Using technology for more efficient management of inland waterways	Transport	Europe
19	Locotrac	Low cost train automatic control	Transport	Wallonia
20	GIR	Integrated Risk Management of Supply Chain	Transport	Wallonia
21	C2A	Connect to All	Transport	Europe
22	BEM	Business Event Manager	Transport	Wallonia
23	SaaS-WMS	Migrating a Warehouse Management System software onto the cloud	Industry	Wallonia
24	I2MSteel	Intelligent Integrated Manufacturing for Steel	Industry	Europe
25	ASCETIC	Adapting Service lifeCycle towards Efficient Clouds	Energy	Europe
26	MidFlex	A flexible middleware for IPv6-based low-power embedded systems	Telecommunications	Wallonia
27	SAT	Smarter Airborne Technologies	Aerospace	Wallonia
28	Living Lab	Laboratory for Open Innovation by Creative Wallonia	ICT and co-creation	Wallonia

Activities

■ Applied Research Technology Transfer

Innovation
Prototyping
Industry

Mechanical Engineering
Aeronautics & Space
Transport & Logistics
Media
Energy
Telecommunications

Application Domains

Software Industry ■ eHealth

Thematics

Open Source
Accessibility

■ Development Life Cycle

Human-Computer
Interaction
Methodologies
Standards
Complex & Optimising Algorithms
Design & Programming Languages

Software & System Engineering (SSE)

Software Development
Effort Estimation
Source Code Analysis
Requirements Engineering
Model Driven Engineering
Software Product Lines

■ Software & Processes

Software Certification
Software Process Quality
Computer Security & Trust
Safety
Model-based Testing
Formal Methods

Electronic Design
FPGA
Ultra Low Power
Embedded Systems

■ Internet of Things

Networks
Wireless Technologies

Embedded & Communication Systems (ECS)

■ Future Internet

Cloud Computing
Service Oriented Architecture
Linked Data
Search Engine & Indexing
Semantic Technologies
Web Services
Big Data Management

Software & Services Technologies (SST)



CENTRE OF EXPERTISE IN ENGINEERING AND QUALITY OF SYSTEMS

The CE-IQS project encompasses several topics in the field of system engineering. Activities are grouped in 5 topics dedicated to methodologies, quality and certification with a technology focus on embedded and distributed systems.

OBJECTIVES

The purpose of the Centre of Expertise in Engineering and Quality of Systems is to help enterprises successfully anticipate the rapid evolution of the ICT sector through Research and Development (R&D) actions based on strong research topics but also aligned according to the programmatic requirement of enterprises. The 5 topics are:

1. Methodologies for Development and Evolution of Systems
2. Verification, Validation and Quality Assessment
3. Certification
4. Embedded and Distributed Systems
5. Intelligent Content and Semantics

RESULTS

The evolution of ICT systems will be studied through the strengthening of methodologies for the complete life-cycle and the integration of Software Product Line engineering. CE-IQS will provide enterprises with methods and tools for improving the control of their systems for the whole lifespan.

Embedded and distributed systems evolve according to the new paradigms induced by the Internet of Things (IoT) and consequently by the technological developments in the areas of intelligent objects, networks, Cloud and Big Data.

ADDED VALUE

The project is finely attuned to the ICT enterprises that are encouraged to propose their own Use Cases. The technologies are then implemented and demonstrated on this basis in order to validate their level of maturity and their accuracy in view of practical requirements in the field. Enterprises can then integrate these technologies with better confidence. They can also rely on CETIC and their partners to support and reduce the time-to-market of their products.

- SOFTWARE CERTIFICATION ■ SOFTWARE PROCESS QUALITY
- STANDARD ■ SOFT DEV EFFORT ESTIMATION ■ SOURCE CODE ANALYSIS
- COMPUTER SECURITY AND TRUST ■ SAFETY ■ SOFTWARE SERVICES TECHNOLOGIES ■ EMBEDDED & COMMUNICATING SYSTEMS ■ SOFTWARE AND SYSTEM ENGINEERING ■ EMBEDDED SYSTEMS
- SEARCH ENGINE AND INDEXING ■ SEMANTIC TECHNOLOGIES

Partners: UNAMUR-PRECISE, CRIDS, Cenaero, UMONS - Pôle TI, UCL-ICTEAM, UCL-INGI, ULB-BEAMS
Type of project: Structural funds in Wallonia - Convergence programs
CETIC budget: €7,131,576
Start date: 1 July 2007
Duration: 2008-2014
Contact: philippe.drugmand@cetic.be



C E L L A V I

CENTER OF EXPERTISE IN OPEN SOURCE SOFTWARE

More and more IT solutions are using open source software at some stage. However, the path to successful adoption is not straightforward due to technological, economic and licensing reasons. On the other side, there are also good practices emerging from open source communities that can suit the needs of local IT companies.

OBJECTIVES

The CELLAVI project supports the specific needs of companies that want to make business use of Open Source software. Indeed, more and more IT solutions are using open source software at some stage. Many companies are interested in open source, from both the technological and economic perspectives, but the path to successful adoption is not straightforward, as the Open Source paradigm involves new licensing schemes and requires that clear economic choices be made.

RESULTS

CELLAVI enables CETIC to develop the required expertise, aligned with local business needs. On the technological side, the project focuses on middleware and "frameworks", as well as the IT infrastructure (software management, deployment, data management,...). The project also takes into account open formats and interoperability and emerging fields, such as open hardware and automated software analysis.

The project also operates a proof-of-concept software forge tailored to the needs of typical SMEs, called Pallavi.

As regards dissemination, contributions are made to events, such as Les Jéudis du Libre and the Rencontres Mondiales du Logiciel Libre.

ADDED VALUE

CELLAVI allows companies to assess the potential benefits of free software, including the technical economic and legal aspects.

The experience gained from operating a forge suited to the needs of SMEs has drawn significant interest from companies inspiring them to enhance their development and collaboration processes. CETIC can also provide software quality insurance, based on open source tools and methodologies.

- OPEN SOURCE ■ STANDARDS ■ METHODOLOGIES ■ SOFTWARE SERVICES TECHNOLOGIES ■ SOFTWARE AND SYSTEM ENGINEERING

Partners: CRIDS, Multitel
Type of project: Structural funds in Wallonia - Convergence programs
CETIC budget: €3,056,390
Start date: 1 July 2007
Duration: 2008-2014
Contact: philippe.drugmand@cetic.be



GO CLOUD - HELPING SMES GO TO THE CLOUD

The goCloud project aims to help enterprises in the IT field benefit from Cloud Computing by allowing them to offer their solutions, more easily, faster and with reduced legal risks.

OBJECTIVES

SMEs in the IT sector should be able to exploit the opportunities offered by Cloud Computing in order to offer their online services faster, more efficiently and to a larger audience. However, use of the Cloud requires specific skills which are insufficiently mastered by SMEs. On the technological side, enterprises willing to put their software online, with a pay-per-use basis while maintaining levels of service, must gain expertise to adapt their software to the Cloud, handle lack of standardisation among Cloud providers, and manage Cloud infrastructures or platforms. On the legal side, lack of knowledge of the rights and obligations of the parties involved which results in legal uncertainty is slowing the adoption of the Cloud. The goCloud project aims to help IT companies to handle the problem globally, in relation to both technical and legal aspects.

RESULTS

The project aims to guide enterprises at each step of their adoption of the Cloud and to help them build their own software toolbox for Cloud migration. To this goal, the project is defining a methodology, backed by tools, allowing to provide software, either new or legacy, more easily in SaaS mode, without imposing a specific technology.

ADDED VALUE

Tools and recommendations issued from the project will allow companies:

- to reduce uncertainty and risk by validating legal constraints both from software providers to their customers and on the link between the software provider and Infrastructure (IaaS) or platform (PaaS) Cloud providers,
- to obtain a new revenue channel by efficiently adapting existing software for use on the Cloud,
- to increase productivity by preparing their software for automatic deployment on the Cloud,
- to increase reliability and availability of provided services by being able to automate management of redundant Cloud environments used to run their software.

- SOFTWARE INDUSTRY ■ CLOUD COMPUTING ■ METHODOLOGIES
- WEB SERVICES ■ SOFTWARE SERVICES TECHNOLOGIES

Partners: CRIDS
Type of project: Walloon programs - Collective Research
CETIC budget: €413,029.40
Start date: 1 July 2013
Duration: 24 months
Contact: stephane.mouton@cetic.be



A REQUIREMENT ENGINEERING TOOLKIT FOR EFFICIENT USER INTERFACE DESIGN

The QualiHM project aims to help UI developers design their user interfaces as dynamic and evolving prototypes integrating the collection, discussion and validation of UI related requirements. The resulting QualiHM toolkit also complies with essential consistency and usability criteria.

OBJECTIVES

An effective User Interface (UI) is a key success factor for interactive systems. Hence, particular attention should be paid to the UI design during the Requirement Engineering (RE) process. In this context, the QualiHM project aims to develop a LGPL3 and multi-platform toolkit for efficient UI Design. The toolkit deals with the limitations of the existing RE tools by supporting the description of requirements in different formats. In addition, QualiHM facilitates the UI design by transforming requirement formats from one to another, generating the UI code and providing feedback about the consistency and usability and of the UI.

RESULTS

The intensive collaboration of CETIC, LILAB and Defimedia, as industrial sponsor of the project, led to the development of the first version of the QualiHM toolkit. This version integrates several modules that enable:

- The description of requirements in different formats to ensure the completeness of UI requirements;
- The management of the traceability between these different requirements formats to strengthen the consistency of UI requirements;
- The evaluation of the quality of UIs by providing feedback regarding their aesthetics.

ADDED VALUE

The QualiHM toolkit ensures the completeness and consistency of UI requirements as well as the quality of the UI. It answers a need the majority of ICT enterprises faces, helping them to improve the quality of their requirements specifications and the resulting UIs. This project will have a significant impact as the User Interface is the most visible part of an application the end user faces.

The resulting tool, with its LGPL3 license, will help ICT enterprises to increase their competitiveness, and potentially avoid unnecessary complex combinations of non-interoperable tools.

- MODEL DRIVEN ENGINEERING ■ USER INTERFACES
- SOFTWARE DEVELOPMENT LIFE CYCLE ■ REQUIREMENTS ENGINEERING
- SOFTWARE AND SYSTEM ENGINEERING

Partners: UCL-LILab
Type of project: Walloon programs - Collective Research
CETIC budget: €421,590
Start date: 1 September 2012
Duration: 30 months
Contact: mohamed.boukhebouze@cetic.be



MODEL-BASED CLOUD PLATFORM UPPERWARE

To avoid situations of vendor lock-in in Cloud Computing, PaaSAGE is developing a methodology and tools to support model-based development of software applications independently of the characteristics of the target Cloud infrastructures.

It also offers support for their optimized deployment in a multi-Cloud environment.

OBJECTIVES

Currently, developers benefit from the savings derived from the use of Cloud Computing but are not able to take full advantage of its flexibility because, clouds, so far, work in silos. In this context, the developer's dream is "develop once, deploy many times on various Clouds". PaaSAGE will make this dream come true.

In order to fulfil this vision, the project aims to develop a modelling language, CAMEL, capable of describing the components of an application and the targets or constraints formulated by the developer for its deployment and execution. PaaSAGE is working on a dedicated platform offering the tools for the development and modelling of applications independently of cloud characteristics as well as the selection of an optimized multi-cloud deployment solution corresponding to the goals set (costs, availability, location of data,...). For optimized deployment across various Clouds, the platform will benefit from information gathered by the users, describing their own deployment scenarios.

RESULTS

The project will deliver an integrated platform, embedding the PaaSAGE methodology, language and tools. The first prototype will be released in October 2014. It will be under Open Source license and supported by a community of users.

ADDED VALUE

PaaSAGE will break the silos in which clouds are currently running. The platform will give the power back to the developers by offering tools for writing and describing applications that can run on various clouds without being rewritten and for deploying them optimally in cross-cloud scenarios. The platform will drastically increase flexibility and reduce costs of implementation and migration.

- REQUIREMENTS ENGINEERING ■ DESIGN AND PROGRAMMING LANGUAGES
- PROOF OF CONCEPT ■ CLOUD COMPUTING ■ WEB SERVICES
- METHODOLOGIES

Partners: HLRS, INRIA, ERCIM, Be.wan, FORTH, STFC, SINTEF, Flexiant, Sysfera, Evry, Lufthansa Systems, ASCS, GWDG

Type of project: European Framework programs - FP7 - ICT
CETIC budget: €694,960
Start date: 1 October 2012
Duration: 42 months
Contact: stephane.waha@cetic.be



PROGRAMMING LARGE-SCALE HETEROGENEOUS INFRASTRUCTURES

POLCA project aims to develop a new approach to address programmability concerns in embedded systems and high-performance computing. Based on mathematical transformations, POLCA will defines annotations and develop a tool chain to transform source code efficient execution on the target architecture.

OBJECTIVES

Specialized processor and reconfigurable architectures such as FPGAs and networks of dataflow-based micro-kernels are difficult to program. However, no programming model or language fully answers the needs of developers. Hence, they usually mix different programming models or use specific frameworks that try to provide the necessary functionalities, but do so at the expense of performance.

With POLCA, a first attempt will be made to jointly address the programmability challenges of embedded and high-performance computing infrastructures. POLCA aims to develop a mathematically-based approach, coupled with a toolchain that supports the right compilation, deployment, and execution configuration on the target architecture optimally exploiting its heterogeneous resources.

RESULTS

Project started in September 2013 with a first focus on the elaboration of the mathematical foundations and the requirements for the targeted use cases. CETIC will build up on the results and experience acquired from the PSOPP project, to develop relevant use cases that can benefit from FPGA based parallelization and acceleration. Signal processing and bioinformatics applications are primarily foreseen.

ADDED VALUE

For CETIC, the development of POLCA approach is oriented toward improving the design process for complex and hybrid FPGA-based embedded systems. The benefits consist of a better design space exploration for those architectures, better management of the complexity and a quicker development cycle.

- EMBEDDED SYSTEMS ■ FPGA ■ EMBEDDED & COMMUNICATING SYSTEMS
- METHODOLOGIES

Partners: University of Stuttgart, University of Ulm, MAXELER Technologies, University of Twente, Recore Systems, IMDEA Software Institute, Universidad Politécnica de Madrid

Type of project: European Framework programs - FP7 - ICT
CETIC budget: €710,015
Start date: 1 September 2013
Duration: 36 months
Contact: lotfi.guedria@cetic.be

DeciWeb



TAKING BETTER DECISIONS WITH WEB DATA

DeciWeb aims at enhancing traditional Business Intelligence analyses by retrieving and integrating relevant data from the Web.

NEW AGILE PLATFORM FOR A LIFELONG ENGINEERING OF SOFTWARE

The NAPLES platform allows SMEs to standardise application development according to the international standard ISO 29110 through workflow-oriented software development.

OBJECTIVES

Business intelligence (BI) is a discipline that provides support to decision-makers, based on the analysis of large datasets. This process can detect new trends, predict the emergence of new competitors or compare information from various data sources. These data sources are internal to the company, i.e. the data are produced, controlled and mastered internally. At the same time, data available on the web have dramatically increased and represent an interesting data source for companies to enrich their own data.

DECiWEB's objective is to propose an approach to allow companies to perform BI analyses such as Online Analytical Processing (OLAP) on corporate but also on external data sources available on the web.

OBJECTIVES

NAPLES promotes the standardisation of software development and project management through workflow-oriented software development, and allows SMEs to standardise their development according to ISO standards. The project increases awareness of the ISO 29110 standard and promotes its adoption through the implementation of workflow covering the standard's entry profile in an online platform.

RESULTS

The integration of web data into the corporate data warehouse is time and effort-consuming. To tackle this challenge, the proposed approach applies technologies of distributed databases to data warehousing, thus considering web data sources as part of the federation (i.e. combination).

CETIC produced a report on the state-of-the-art in the integration of web data inside corporate data warehouses. CETIC also designed a language to express the schema of this federated/augmented data warehouse.

RESULTS

- Integration of software engineering tools for project management and requirement management in the NAPLES platform;
- Implementation of workflow templates based on the ISO 29110 entry profile for execution by the Bonita Open Solution workflow engine;
- Implementation of a portal to provide information to different users according to their role in a given project. The portal also provides summarised information on project data via dashboards.

ADDED VALUE

SMEs will be able to enhance their business intelligence in a simple and powerful way thanks to the service-oriented Cloud API developed by CETIC which facilitates the integration of web data into their business analyses.

ADDED VALUE

In the software industry, SMEs have difficulty standardising their development process, owing to the complexity of the jargon and structure of the ISO standard on development life-cycle processes. As a result, SMEs cannot be officially recognised as companies providing good software in their field which therefore limits their growth potential.

The NAPLES platform helps SMEs to standardise their software development tasks according to the international standard ISO 29110 at a greatly reduced cost.

- SOFTWARE INDUSTRY ■ SOFTWARE SERVICES TECHNOLOGIES ■ BIG DATA
- OPEN DATA ■ LINKED DATA ■ FUTURE INTERNET

Partners: ULB, Universitat Politècnica de Catalunya
Type of project: Walloon programs - Fisrt DoCA
CETIC budget: €212,800
Start date: 1 January 2013
Duration: 24 months
Contact: orlando.cassano@cetic.be

- SOFTWARE INDUSTRY ■ DEVELOPMENT LIFECYCLE ■ SOFTWARE AND SYSTEM ENGINEERING ■ PROOF OF CONCEPT ■ SOFTWARE TOOLS AND ENVIRONMENTS

Partners: UNAMUR-PRECISE, Océ Software Laboratories, Atos IT Solutions and Services
Type of project: Competitiveness clusters - Technological Innovation Partnership
CETIC budget: €606,338.25
Start date: 1 March 2010
Duration: 42 months
Contact: jean-christophe.deprez@cetic.be

CALiPro

AUTOMATED CONFIGURATION OF SOFTWARE PRODUCT LINES

CALiPro aims to improve and automate the configuration phase of software product lines through the development of innovative tools, services and methods.

OBJECTIVES

Increasingly, software products are designed to include many variants, collectively constituting a software product line (SPL). In mass consumption products, this software flexibility has become necessary in order to achieve the level of customisation required to meet the needs of an ever more demanding market (e.g. ERPs, telecommunication services, e-business, e-government services, open source software, etc).

CALiPro is focusing on the improvement of the Application Engineering phase, which is the phase during which a product is assembled and configured from intermediary reusable components. There is a lack of tool support in that phase confirmed by several companies that have engaged in such an approach.

RESULTS

The CALiPro project produces a set of innovative tools, services and methods to provide support for modelling and reasoning on SPL of industrial size. The tooling is also supporting reasoning on any product line. More precisely:

- definition and formalisation of a TVL2 supporting key industrial features like cardinalities and richer types;
- support of the configuration process through efficient queries and verification checks across definition, filtering, propagation, validation, and explanation operations;
- definition of a generic solver interface and integration of powerful SMT solver implementing the above verification checks, based on experience acquired in collaboration with the CSAIL lab of MIT;
- validation on several case studies including a very large industrial problem in the electrical engineering domain.

ADDED VALUE

CALiPro contributes to the industrial adoption of product lines in the software domain but is not restricted to it as it mostly focuses on the design stage. It helps reducing the cost in engaging in a product line approach by providing faster return on investment through better and systematic reuse, faster time-to-market of product variants and more efficient quality control.

■ SOFTWARE INDUSTRY ■ SOFTWARE PRODUCT LINES ■ MODEL-DRIVEN ENGINEERING ■ SOFTWARE AND SYSTEM ENGINEERING

Partners: UNAMUR-PRECISE, MIT
Type of project: Walloon programs - First DoCA
CETIC budget: €210,000
Start date: 1 January 2010
Duration: 48 months
Contact: raphael.michel@cetic.be

eHealth for Citizens

ICT SERVING PATIENTS

In response to the ageing of society, the increase in chronic illnesses and the shortage of caregivers, this project is developing innovative IT-based services designed to respond to the needs of patients, healthcare professionals and IT providers in this sector.

OBJECTIVES

In response to the challenges posed by the evolution of healthcare, eHealth for Citizens project is aimed at designing and implementing a service-oriented platform capable of combining and supporting innovative eHealth services. The services designed during the project aim to improve the quality of life of patients at home. Several specific research topics are addressed by the project team: user interface usability, dynamic service composition, data interoperability and security.

The designed technologies are integrated and being validated through pilot projects realized in collaboration with healthcare professionals.

RESULTS

In 2013, the focus was on finalizing the first pilot project started in 2012 and analysing its results. The first version of eHealth platform developed by CETIC integrates the following key features: health telemonitoring service with automatic alert generation, communication and entertainment services for elderly persons and specific decision support services for the Caregivers. The prototype is connected to Walloon Health Network (RSW) to enable easy and direct access to telemonitoring data by healthcare professionals.

The positive results of the pilot project allowed the CETIC team to design new components that will be added and tested in 2014.

ADDED VALUE

The technologies developed by this project can be used to build new and innovative eHealth applications. CETIC has also developed extensive experience in the creation of applications that call for multidisciplinary expertise: various profiles in the health sector, providers of technological solutions, etc.

■ EHEALTH ■ WEB SERVICES ■ SOFTWARE SERVICES TECHNOLOGIES
 ■ EMBEDDED & COMMUNICATING SYSTEMS ■ SOFTWARE AND SYSTEM ENGINEERING ■ STANDARDS ■ COMPUTER SECURITY AND TRUST

Partners: UNAMUR-PRECISE, CRIDS, Immunehealth, UCL-ILSM
Type of project: Structural funds in Wallonia - Convergence programs
CETIC budget: €1,205,509
Start date: 27 October 2009
Duration: 2009-2015
Contact: philippe.drugmand@cetic.be



DEVELOPMENT OF AN ELECTRONIC PATCH FOR GEOLOCATION AND FALL DETECTION OF PEOPLE WITH MENTAL DETERIORATION

The e-Patch project aims to study and develop an electronic patch equipped with long-range wireless communication allowing for geolocation and fall detection. E-Patch will be designed to improve the tele-monitoring of people with mental deterioration and to optimise their support in case of critical incidents like fall or loss.

OBJECTIVES

In the current context of an ageing population with an increase of the number of people with mental deterioration (memory impairment, dementia, Alzheimer's disease, cognitive disorders, etc.), the need is more and more stressed for monitoring and supporting services with appropriate handling of the specific demands of this category of persons.

To address this problem, the e-Patch project aims to provide an innovative technological tool consisting of an intelligent electronic patch that can detect falls reliably, locate the wearer and then provide remote and automatic messaging for quick and effective support to the affected person.

RESULTS

The project partners are designing an electronic patch, optimizing the resource usage - lowest cost, lowest electric consumption -, and providing the best comfort for the wearer. To achieve these goals, flexible printed circuits are used. The project also focuses on integrating electronics in a medical grade patch, and solving the corresponding manufacturing issues. A proof of concept is currently being tested.

CETIC is primarily responsible for the design and prototyping of the electronic component of the patch.

ADDED VALUE

CETIC ensures technology transfer to the industrial partners of the project that will further push the project results through the industrialization and commercialization of the prototype. An advisory committee, made up of health professionals and industrials has been established to oversee the research.

The project will also help CETIC deepen its expertise in design of Ultra Low-Power embedded systems which will apply and benefit to many application domains beyond the project.

- EHEALTH ■ EMBEDDED & COMMUNICATING SYSTEMS
- ELECTRONIC DESIGN ■ EMBEDDED SYSTEMS ■ ULTRA LOW POWER
- WIRELESS TECHNOLOGIES

Partners: Nomics, Centexbel, Sioen
Type of project: Competitiveness clusters - MecaTech
CETIC budget: €325,469
Start date: 1 March 2013
Duration: 2013-2016
Contact: lotfi.guedria@cetic.be

DAPCARE

PATIENT DOSIMETRY EBOOK

DAPCARE is aimed at developing the Patient Dosimetry eBook, a standardised solution for archiving and sharing dosimetric data for patients receiving medical ionising radiation delivered in various departments of healthcare institutions.

OBJECTIVES

As medical practices frequently use ionising radiation for diagnostic and therapeutic purposes, this project is developing tools for collecting, archiving and optimising patient dosimetry data. The goals are to propose practical solutions to specific problems encountered in the radiation protection domain and to promote the exchange of standardised data.

While the safety of healthcare professionals exposed to the dangers of ionizing radiation has long since been regulated, the monitoring of patient dosimetry is still in its infancy and is an emerging problem due to the rapid development of medical imaging techniques.

RESULTS

The software solution produced by CETIC embodies the following key features; a state-of-the-art dosimetric data exchange to enable access to dosimetry harvested locally at individual institutions and those stored at other institutions via web services and a comparative analysis of Belgian and French and international standards, KMEHR-Bis and IHE-REM and DICOM RDSR (Radiation Dose Structured Report) respectively. Hospital practices for managing dosimetric data have also been collected and analysed in the light of these standards, to identify shortcomings with the aim of improving the interoperability of dosimetric data within Belgium and France. For Belgium, the software necessary to manage dosimetries and an application server exchange between sites to integrate the standards and technologies in Walloon Health Network, is being implemented. For France, the Patient Dosimetry eBook will be used to exchange patient dosimetric data.

ADDED VALUE

The DAPCare software for healthcare institutions enables the exchange of standardised patient dosimetry at both national and international levels.

- EHEALTH ■ SEMANTIC TECHNOLOGIES ■ STANDARD ■ EMBEDDED & COMMUNICATING SYSTEMS ■ SOFTWARE AND SYSTEM ENGINEERING

Partners: Centre Oscar Lambret, CIGES, CCML, CHBM, ISLOG
Type of project: International programs - ERANET - LEAD ERA
CETIC budget: €164,394
Start date: 1 October 2011
Duration: 36 months
Contact: annick.majchrowski@cetic.be



SUPPORT PATIENTS THROUGH E-SERVICE SOLUTIONS

SPES aims at transferring the approach and results achieved in the implementation of OLDES project to support patients from four European locations through e-service solutions, especially tailored to manage respiratory problems, dementia, handicapped people and social exclusion.

OBJECTIVES

For people who already encounter difficulties in their daily life (cognitive, functional, financial, ...), the evolution of Information and Communication Technologies (ICT) may initially appear as a contributing factor to their isolation. However, these technologies can also enable them to increase their autonomy and social interaction and to safely stay as long as possible in their familiar environment.

The objective of the OLDES project was to develop and evaluate a tele-care and entertainment platform prototype involving patients and their caregivers. SPES has also allowed to transfer and extend the results achieved in OLDES.

SPES was designed around four pilots: the province of Ferrara (Italy), the city of Vienna (Austria), the city of Brno (Czech Republic) and the city of Kosice (Slovakia), focusing respectively on the following: respiratory problems, dementia, handicapped people and social exclusion.

RESULTS

CETIC has specified, designed and developed the SPES platform prototype. This mainly consists of an intuitive software solution for the patients of the different target groups that can be used on a touch screen computer, a classical laptop or a tablet. The SPES platform also includes a web portal to enable the patients' monitoring by their caregivers (physicians, social workers in day-care centers, ...).

The positive patient feedback was a major result of the project. In addition, some services, like the geo-location and tracking by authorized operators of seniors with dementia, will continue to be used and evolve following the end of the project.

ADDED VALUE

Telemedicine favours the emergence of a new market of healthcare service providers that can support the delivery of health and social care at home. SPES has demonstrated ICT-based solutions that are replicable and generalizable by other actors.

The involvement of CETIC allows one to transfer these results to Wallonia where telemedicine and eHealth are also emerging: this field is open to innovative enterprises proposing adapted solutions that are an answer to the economic pressure on the healthcare costs.

- EHEALTH ■ SOFTWARE SERVICES TECHNOLOGIES ■ EMBEDDED & COMMUNICATING SYSTEM ■ SOFTWARE AND SYSTEM ENGINEERING
- EMBEDDED SYSTEMS ■ WIRELESS TECHNOLOGIES ■ WEB SERVICES

Partners: ENEA, CVUT, CUP 2000, AUSL, Universität Wien, Kosice, Technical University of Košice, ProDeep, Provincia di Ferrara, Vienna Social Fund
Type of project: European Framework programs - Central Europe
CETIC budget: €275,875
Start date: 1 April 2011
Duration: 39 months
Contact: valery.ramon@cetic.be



ADAPTATIVE PILOTING OF HOSPITAL PROCESSES

The PIPAS project aims at developing a software solution to help in modelling, piloting and supervising healthcare processes for treating patients, in the area of cancer care.

OBJECTIVES

The hospital world is facing increasing challenges regarding care quality, notably in the cancer domain, where patients suffering from multiples pathologies have to follow complex treatments, and rely on shared infrastructure. The modelling of clinical pathways is increasingly used to explicit the key steps of those treatments and contribute to answer their inherent challenges.

The objective of the project is to support the implementation of process management systems for driving clinical pathways, and overcome the limitations of current systems. Current systems are based on imperative workflows which are unable to take into account the interferences between workflows. The proposed approach is based on mixed imperative-declarative models, operators enabling the engineering of complex workflows and tools for the optimal process enactment wrt. declarative constraints such as timing constraints.

RESULTS

PIPAS project produced a toolset supporting:

- the definition definition of imperative and declarative models of care processes;
- the execution of models to pilot the care team and manage resource conflicts occurring at runtime, based on the Oscar.CBLS engine;
- The monitoring of executing processes using indicators derived from the model and dashboards views.

ADDED VALUE

The produced software meets real needs faced by hospitals to ensure care quality with limited resources and clinical processes growing in number and complexity.

The principles and tool developed by PIPAS for piloting hospital processes and clinical pathways can be exploited by medical software editors addressing this domain or directly by large hospitals which are managing the integration of IT innovation themselves.

The underlying principles are reusable by hospitals managing their IT infrastructure and support themselves, as well as by broader workflow management system editors.

- EHEALTH ■ OPTIMISATION DE SYSTÈMES COMPLEXES ■ MODEL-DRIVEN ENGINEERING ■ SOFTWARE AND SYSTEM ENGINEERING

Partners: UCL-INGI, Centre du Cancer
Type of project: Walloon programs – WIST 3.0
CETIC budget: €274,505
Start date: 1 April 2011
Duration: 41 months
Contact: christophe.ponsard@cetic.be



AUTOMATIC MONITORING OF ACTIVITIES USING CONTACTLESS SENSORS

AMACS in an EraSME project whose goal is to develop and evaluate in real-life situations an ICT-based system that can automatically monitor the activities of daily living (ADLs) (sleeping, cooking, making a phone call,...) of elderly people living alone at home.

OBJECTIVES

AMACS develops and evaluates in real-life situations an ICT-based system that can automatically monitor the activities of daily living (ADLs) of elderly people living alone at home. Some examples of such activities are: sleeping, cooking, making a phone call, visiting the toilets, washing... The monitoring is based on measurements of various contactless sensors that are installed in the elderly person's home environment: home security sensors (presence or motion detectors), sensors that measure the consumption of public utilities (electricity, water, gas) and video cameras. The goal of this project is to allow elderly people presenting age-related risks or pathologies (e.g. risk of fall, cognitive decline) to remain safely in their home environment for as long as possible.

RESULTS

Together with the other Walloon partners, CETIC is in charge of the definition, design and development of the exchange platform which collects the information about ADLs and changes in seniors' behaviour and adequately communicates this information to the senior citizens, their medical records and their caregivers (including the general practitioner and the visiting nurse). They also implement the adaptations of software solutions used by the general practitioner and the nurse to take into account this extra information.

The prototype is evaluated in real-life situations, i.e. based on the measurements done in the living quarters of a few senior citizens.

ADDED VALUE

The project results can be of interest for companies providing ICT services in the healthcare sector and in particular those proposing health telemonitoring systems.



EFFICIENT PATIENT RECRUITMENT FOR INNOVATIVE CLINICAL TRIALS OF EXISTING DRUGS TO OTHER INDICATIONS

PONTE supports the entire clinical trial process, so that it is easier to create a research hypothesis, define the protocol and select the right patients. As a result, the public has quicker access to better, safer and cheaper drugs.

OBJECTIVES

PONTE is aiming to develop a Service Oriented Architecture (SOA) and Semantics Web platform for the identification of patients for clinical trials dedicated to drug repositioning. The solution had to mitigate safety risks and improve clinical trial costs and efficiency. CETIC has contributed to standardisation, Semantic Web research and development, security, and the SOA. CETIC was also the project coordinator.

RESULTS

The PONTE outcomes cover the clinical trial design process, as well as patient recruitment from many hospitals and the results of active investigation and implementation of security and legislative requirements for patient health. The design is supported by a semantic search engine that retrieves information from the clinical literature and from linked data (and Open Data), uses an online authoring tool capable of identifying suitable patients and provides decision support to clinical investigators.

ADDED VALUE

The health and pharmaceutical industries are searching for ways to improve clinical trial design in terms of cost, time and patient safety. Semantic Web concepts, carefully integrated into applications designed in close collaboration with domain experts, are helping to improve the efficiency of clinical trial design.

■ EHEALTH ■ EMBEDDED & COMMUNICATING SYSTEMS ■ WIRELESS TECHNOLOGIES ■ STANDARDS ■ LINKED DATA

Partners: Smolinfo, PCsol, Intersysto, KHK-Mobilab, Fontys, WENK, KU Leuven
Type of project: International programs – ERANET - ERA-SME
CETIC budget: €149,800
Start date: 1 October 2010
Duration: 33 months
Contact: philippe.drugmand@cetic.be

■ EHEALTH ■ COMPUTER SECURITY AND TRUST ■ SEMANTICS ■ SOFTWARE SERVICES TECHNOLOGIES ■ SOFTWARE AND SYSTEM ENGINEERING

Partners: CNR, NTUA-ICCS, TUDresden, LSMU, CUH, NKUA, LUH
Type of project: European Framework programs - FP7 - ICT
CETIC budget: €694,875
Start date: 1 March 2010
Duration: 36 months
Contact: philippe.massonet@cetic.be



NORTH-WEST EUROPE DYNAMIC RIDESHARING

Today, carpooling platforms have a very tight supply in terms of information, number of users and journeys, especially across borders. NweRIDE proposes to improve the adoption of carpooling via an exchange platform for carpool operators.

OBJECTIVES

NweRIDE aims to interconnect carpool and public transport operators in order to increase the relevance of carpooling offers, hence promoting ridesharing. This interconnection is done thanks to an IT platform that is focused on dynamic carpooling, i.e. for non-scheduled trips, especially for cross-border journeys (Netherlands, Belgium, UK, France, Germany).

RESULTS

CETIC implements the interconnection platform using the RDEX standard. This standard enables carpooling systems to share carpooling offers in a secure way via Web services.

CETIC also participates in the development of high value-added services using semantic web data sources promoting Open Data.

Finally, CETIC leads a pilot project that aims to foster carpooling among companies located in the same business park thanks to the sharing of their business events agendas.

ADDED VALUE

The project aims to offer a new one-stop-shop solution for carpooling based on mobile technologies, using web data sources, able to adapt itself to the users needs, updated in real time, and able to offer alternatives based on public transport when needed.

The expertise acquired during the project will allow CETIC to better support SMEs as regards advanced problems related to the interconnection of web-based IT systems, in order to provide new value-added services.

- TRANSPORT ■ WEB SERVICES ■ OPEN DATA ■ LINKED DATA ■ SEMANTIC TECHNOLOGIES ■ BIG DATA ■ SOFTWARE SERVICES TECHNOLOGIES
- EMBEDDED & COMMUNICATING SYSTEM

Partners: VIM, SESTran, Sellmark, Stellwerk, Taxistop, Staffordshire County Council
Type of project: International programs – InterReg IV B NWE
CETIC budget: €279,099
Start date: 28 June 2013
Duration: 27 months
Contact: frederic.fleurialmonfils@cetic.be



USING TECHNOLOGY FOR MORE EFFICIENT MANAGEMENT OF INLAND WATERWAYS

The Numerical project aims at connecting regional and national strengths, knowledge and experience of 7 organizations active in the field of ICT and waterways management to create a transnational strategy for the development of e-services along waterways.

OBJECTIVES

Numerical aims at developing innovative approaches using ICT in order to improve sustainable modes of transport and tourism along waterways. The project will help to strengthen waterways management systems through use of ICT and e-services. In addition, the project will help strengthen the economic influence of the waterway within the territory. CETIC is the ICT partner of the project. Its role is to recommend, validate and coordinate the ICT solutions of the project.

RESULTS

Several ICT solutions will be developed during the project, including:

- A transnational framework in North West Europe in relation to mobile access and Internet connectivity in rural and urban areas;
- A series of model approaches for online services and information (geolocation of the place of interest, online booking...);
- A series of model approaches of Intelligent Transport Systems (management of the stopover and nautical ports, management of traffic and bottlenecks...);
- Local pilot actions to implement the above approaches and to increase the potential of commercial and leisure along the waterways, and waterways as a tourism destination.

ADDED VALUE

The project will provide innovative tools to effectively manage waterways while respecting their social, economic and environmental needs. These innovative tools will help strengthen the water-based economies of and water-side industries e.g. leisure, industry and therefore of local areas. In addition, the project will help to reinforce the boating potential and the tourism economy by offering innovative e-services along waterways.

The expertise acquired during the project will allow CETIC to better support SMEs to develop interconnected e-services that allow data exchange, especially in areas where communication technologies are less available.

- TRANSPORT ■ TELECOMMUNICATIONS ■ REQUIREMENTS ENGINEERING
- NETWORKS ■ WEB SERVICES ■ EMBEDDED & COMMUNICATING SYSTEMS

Partners: Canal & River Trust, Voies Navigables de France, Gemeente Eijsden-Margraten, Midland Regional Authority, SRN, Gemeente Eindhoven
Type of project: International programs – InterReg IV B NWE
CETIC budget: €116,580
Start date: 28 June 2013
Duration: 35 months
Contact: frederic.fleurialmonfils@cetic.be

LOCOTRAC

LOW-COST TRAIN AUTOMATIC CONTROL

Locotrac project aims to develop low-cost technologies to secure regional and local railway lines including mechanisms of ATP (Automated Train Protection). The project will integrate these new technologies into onboard products, track products and telecoms specially adapted to these lines.

OBJECTIVES

The project objectives are:

- Better understanding of the specific market needs of European regional and local railway lines (but also worldwide due to the standard ERTMS);
- The search for new system concepts that aim to meet their needs with a low cost LCC (Life Cycle Cost);
- Integration of new technologies (security architecture, localization technique, new telecom technology,...) in the specification and development of new products;
- Finding the highest level of compatibility with the ERTMS standard ensuring a level of interoperability between these lines and trunks;
- To prepare adequately the development of new standards, prerequisite to actually open market (harmonization of specifications and developed by European industrial solutions);
- Demonstrate these new concepts through a mock-up of the new systems, subsystems and produce a full-scale experiment on the railway site;
- To validate these new concepts by taking into account performance level, RAMS (Reliability, Availability, Maintainability, Safety) level and ERTMS interoperability level. The research undertaken by the CETIC in this project concerns software hardening. This technique makes possible to reach a high level of safety for software-executing security function.

RESULTS

Hardening algorithms have been specified and a development compatible with a critical use (SIL4) is under development.

ADDED VALUE

The hardening algorithms will allow ALSTOM to deliver low-cost equipments and so to increase his competitiveness on the international market.

■ TRANSPORT ■ SAFETY ■ SOFTWARE AND SYSTEM ENGINEERING

Partners: UMONS, UCL-ICTEAM, Alstom, ACIC, Logiplus, CE+T, MITRA Innovations, Q3S, SEE, STIB, Infrabel
Type of project: Competitiveness clusters - Logistics in Wallonia
CETIC budget: €383,255
Start date: 1 April 2011
Duration: 48 months
Contact: gautier.dallons@cetic.be



INTEGRATED RISK-MANAGEMENT OF SUPPLY CHAIN

The GIR project aims to provide an effective ICT solution to improve the security of hazardous goods transport. The software tool developed during the project will assist safety advisers in managing compliance with transport regulations and also exploiting information related to transported goods, the communication of which can be extremely useful in the event of an accident. This information will be communicated by modules embedded in transport containers.

OBJECTIVES

The massive volume of regulations applying to different means of transport of hazardous goods (road, rail, maritime, waterways) and various national adaptations and amendments to these regulations makes the tasks of safety advisers extremely difficult.

The main objective of the project is to assist safety advisers in their management of hazardous goods transport by automating protocols monitoring, conformity checking, reports generations, products compatibility verification, and critical events handling (accident).

CETIC is mainly responsible for developing the embedded alert module and its integration with the overall solution.

RESULTS

CETIC elaborated a survey on the embedded alert systems detailing their characteristics and respective usage context. In addition, a study on the traceability techniques applicable to hazardous goods transport was conducted with special focus on systems and solutions related to RFID technology.

In addition, the specifications of the embedded application were elaborated and a comparative analysis of various generic hardware platforms allowed the selection of the module to be used for the alert.

The development of the different building blocks of the alert system is in progress.

ADDED VALUE

The GIR solution will have a positive impact on work of the safety advisers responsible for ensuring compliance with regulations in companies which transport hazardous goods. The tool will help them to save time by automating tedious and human-error-prone tasks such as checking, monitoring, protocols validations, report generation, etc. The automatic alert module will also allow quicker response and better management of serious incidents like transport accidents.

■ TRANSPORT ■ EMBEDDED & COMMUNICATING SYSTEMS
 ■ EMBEDDED SYSTEMS

Partners: Océ Software Laboratories, DN&T, PRAYON, SPRL Luc Beyers, Joassin sa, ULg - ANAST
Type of project: Competitiveness clusters - Logistics in Wallonia
CETIC budget: €321,572.22
Start date: 1 April 2012
Duration: 36 months
Contact: lotfi.guedria@cetic.be



CONNECT TO ALL

The C2A project aims to design, develop and implement an intelligent interconnection system between embedded hybrid equipment in transport vehicles. The project goal is to optimize and extend the use of embedded resources which will allow for the composition of new innovative services.

OBJECTIVES

Various embedded equipment are becoming more and more numerous inside transport vehicles. Apart from mandatory devices such as the tachograph, various other equipment is available such as radio communication systems (GSM / GPRS), localisation devices (GPS), and a variety of miscellaneous tools and equipment for specific needs (data loggers, PC tablet, cameras, mobile phones, on-board computers, etc.). However the lack of interoperability results in duplication of services, redundancy of system features and sub-optimal utilization of available hardware and software resources.

The C2A project aims to develop a generic technology for interoperability ("intelligent communicating bus") allowing communication and resource sharing between embedded devices in the vehicle.

RESULTS

The project had two main components:

- R&D activities consisting of design, development and implementation of an embedded system prototype allowing connection and automatic recognition of a wide range of peripheral devices.
- A dissemination action of which the objective is to implement a structured communication involving both ICT services companies and transport and logistics operators around the R&D work in the project. The Proof-Of-Concept illustrated some of the innovative features of the system such as the automatic recognition of peripherals, the continuous monitoring of the status of available resources and the activation of simple services based on the gathered data.

ADDED VALUE

The ICT companies can develop new features and services by interfacing their solutions to the C2A system and accessing an extended data set. They could also implement their own services on top of C2A architecture or integrate the C2A building blocks into their own solutions. Companies and operators of transport and logistics field can deploy these new services and benefit from a flexible system easily adaptable and extensible.

- TRANSPORT ■ EMBEDDED & COMMUNICATING SYSTEMS
- EMBEDDED SYSTEMS

Partners: Smolinfo, INFOPOLE Cluster TIC, Carinna, DOCledge, CRESTIC
Type of project: International programs – Interreg IV-A FWL
CETIC budget: €327,000
Start date: 1 September 2008
Duration: 54 months
Contact: lotfi.guedria@cetic.be



BEM - BUSINESS EVENT MANAGER

The BEM solution helps enterprises to minimise the fallout resulting from unexpected events, especially in the transportation and distribution sectors, thanks to an affordable yet optimised implementation of intelligent workflow management to solve complex problems and deal with unexpected situations.

OBJECTIVES

The goal of the BEM project is to develop and validate a new IT approach to manage unexpected events in the transportation and distribution sectors. Such events can deeply affect physical and organisational flows, requiring complex process re-alignment and re-optimisation to bring the system back into normal operation.

BEM proposes a process management solution built on top of state-of-the-art artificial intelligence engines and fitted with temporal coordination capabilities. The goal is to minimise the negative consequences of incidents and simplify flow management.

RESULTS

The BEM tool is deployable in logistic environments and integrates the following key elements:

- a process manager based on events and integrating temporal coordination aspects,
- the description of logistic processes using specific business rules,
- a method for describing the management of unexpected events.

For the project, CETIC notably produced a goal-oriented requirements analysis using the KAOS approach and the Objectiver tool, as well as a tool-supported methodology to describe the different processes, activities, events, exceptions and resources involved in a specific application domain. This methodology includes:

- a meta-model to structure this type of information,
- an interview template to discuss with stakeholders and capture this information, as well as specific business rules and constraints to consider,
- a tool support based on YAWL to facilitate the encoding and transmission of these specifications to the intelligent reasoning engine.

ADDED VALUE

BEM provides enterprises with:

- Minimal detrimental fall-out resulting from accidents,
- An affordable yet optimised implementation of intelligent workflow management to solve complex problems and deal with unexpected situations.

- TRANSPORT ■ MODEL-DRIVEN ENGINEERING ■ SOFTWARE AND SYSTEM ENGINEERING

Partners: Smolinfo, NSI, UNAMUR-EGES, UNAMUR-FOCUS, UNAMUR-SLC
Type of project: Competitiveness clusters - Logistics in Wallonia
CETIC budget: €274,850
Start date: 1 May 2010
Duration: 36 months
Contact: ravi.ramdoyal@cetic.be



MIGRATING A WAREHOUSE MANAGEMENT SYSTEM SOFTWARE TOOL ONTO THE CLOUD

Industrial legacy software sometimes comes with responsiveness and availability constraints that is barely compatible with the cloud SaaS model.

SaaS-WMS aims to demonstrate how such an application can be adapted to a cloud usage through a Warehouse Management Software usage case.

OBJECTIVES

INGRIF is releasing a warehouse management and supply chains software (WMS). Such software comes with response time and availability constraints, which could only be fulfilled by installing the computer server within the customer's infrastructure. However, user expectations have changed, and are turning towards online software in the cloud.

The project aims to demonstrate the technical feasibility of adapting such a demanding application into an SaaS mode. However, the Internet network comes with no guarantee about response time. The application will then be adapted to compensate for the lack of responsiveness guarantee, and its virtual infrastructure auto-adapts itself to keep the same performance level.

RESULTS

At the end of the project, our partner INGRIF will benefit from a software tool in SaaS mode so that cloud VMs can be automatically adjusted according to the workload while respecting responsiveness requirements. Meanwhile, CETIC will have implemented an infrastructure management and auto-adaptive framework. Moreover, CETIC will improve its methodology in assisting SMEs to port their software to the cloud, and will enhance its expertise in orchestration and optimization of services.

ADDED VALUE

Such a proof of concept responds to an actual demand:

- either because the solution aims to a new market, made of SMEs which are reluctant to invest in an overly expensive solution;
- or because it offers an answer to companies looking for a turnkey solution, freeing them from the constraints of IT management.

■ SOFTWARE INDUSTRY ■ CLOUD COMPUTING ■ SOFTWARE SERVICES TECHNOLOGIES

Partners: Ingrif
Type of project: Walloon programs - CWality
CETIC budget: €127,226.80
Start date: 1 October 2013
Duration: 18 months
Contact: stephane.mouton@cetic.be

I2MSteel

INTELLIGENT INTEGRATED MANUFACTURING FOR STEEL

To remain competitive, the European steel industry requires improvement of its processes. The project aims to develop a new paradigm where software agents, at each step of the steel manufacturing chain, negotiate between them and dynamically optimize production.

OBJECTIVES

A completely new paradigm of automation and information technology systems for intelligent and integrated manufacturing in steel production (I2MSteel) is envisioned to overcome the current production challenge, which is to combine the large variety of existing processes and plants into a single, highly inter-linked process chain. The suggested solution is the application of holonic agent technology to build this new paradigm. A holonic agent is an autonomous and flexible computational system operating in a particular environment. Agents have 'social' abilities, allowing them to engage with other components through communication and coordination. Two other technologies are also required: a Service-Oriented Architecture (SOA) to create an underlying framework to provide the agents with all the necessary information; and semantic techniques (ontologies, in this case) to give the agents an 'understanding' of their environment and of the data coming from the SOA.

RESULTS

In I2MSteel, CETIC is identifying shortcomings in data exchanges and SOA deployment in an industrial environment, while exercising semantic skills in a new domain (the steel industry). The experience gained can be directly applied to help solve problems of local SMEs, especially subcontractors, in the industrial sector.

ADDED VALUE

In I2MSteel, CETIC is identifying shortcomings in data exchanges and SOA deployment in an industrial environment, while exercising semantic skills in a new domain (the steel industry). The experience gained can be directly applied to help solve problems of local IT companies, especially subcontractors, in the industrial sector.

■ SERVICE ORIENTED ARCHITECTURE ■ CLOUD COMPUTING ■ WEB SERVICES ■ SEMANTIC TECHNOLOGIES

Partners: ArcelorMittal Research, Centro Sviluppo Materiali, BFI, Siemens, AIT
Type of project: European Framework programs - RFCS
CETIC budget: €412,886
Start date: 1 July 2012
Duration: 42 months
Contact: stephane.mouton@cetic.be



ADAPTING SERVICE LIFECYCLE TOWARDS EFFICIENT CLOUDS

The ASCETIC project is focused on providing novel methods and tools to support software developers aiming to optimise energy efficiency and minimise the carbon footprint resulting from designing, developing, deploying, and running software in Clouds.

OBJECTIVES

The project has the following main objectives:

- Development of models for green and efficient software design, supporting sustainability and high quality of service levels;
- Development of methods for measuring, analysing, and evaluating energy use in software development and execution, complementing quality measures;
- Energy and quality efficiency integration into service construction, deployment, and operation leading to an Energy Efficiency Embedded Service Lifecycle.

RESULTS

ASCETIC will result in the implementation of an open-source Cloud stack providing energy efficiency at software, platform, and infrastructure levels. The project will provide incremental versions of its solution, with respect to energy efficiency, and demonstrate its use in two commercial use cases.

ADDED VALUE

ASCETIC results will enable software service providers to operate their services with a lower energy footprint. Transitivity, this reduction will translate in cheaper operation costs. Furthermore, developers will benefit from the ASCETIC development environment plugins to produce software services with reduced energy needs while maintaining other quality services at the desired level.

- ENERGY ■ CLOUD COMPUTING ■ SOURCE CODE ANALYSIS
- SOFTWARE SERVICES TECHNOLOGIES

Partners: Atos, TUBerlin, University of Leeds, HP, BSC, ATC, GPF, AUEB
Type of project: European Framework programs - FP7 - ICT
CETIC budget: €493,230
Start date: 1 October 2013
Duration: 36 months
Contact: jean-christophe.deprez@cetic.be

MIDFLEX

A FLEXIBLE MIDDLEWARE FOR IPV6-BASED LOW-POWER EMBEDDED SYSTEMS

MidFlex aims to develop a middleware to facilitate the design and deployment of IPv6-based sensor network applications in the scope of the Internet of Things.

OBJECTIVES

This PhD thesis aims to provide a middleware harnessing the flexibility and configurability of underlying technologies and protocols to achieve end goals such as minimal energy consumption of a network, or the support for device mobility. Furthermore, in light of the Future Internet initiatives and the upcoming Internet of Things, this thesis has a strong focus on the interconnection of networked objects to the Internet and common consumer devices such as smartphones and tablets.

RESULTS

CETIC studies the implementation and deployment of WSN application based on technologies currently in standardisation, such as 6LoWPAN and RPL, IETF's IPv6 Routing Protocol for Low Power and Lossy Networks. These studies rely on three distinct test environments: a software time-accurate simulator for wireless sensor networks (COOJA), physical sensor platforms part of CETIC's Wireless Lab, and large-scale academic wireless sensor testbeds open for experimentation. In particular, tests on the SensLAB testbed of INRIA Lille and the TWIST testbed of TU-Berlin validated the stability of RPL and the embedded IPv6 stack of Contiki.

The middleware components were made available in the public domain, with CETIC as an enabler for technological transfer. It mainly concerns an implementation of a 6LoWPAN Border Router, the 6LBR component.

ADDED VALUE

This research project has a direct impact for local Walloon companies keen to integrate Internet of Things solutions in their products. As of today, CETIC's expertise is already guiding companies in design choices for sensor network hardware and software.

- TELECOMMUNICATIONS ■ NETWORKS ■ INTERNET OF THINGS
- EMBEDDED SYSTEMS

Partners: SICS, IP Networking Lab
Type of project: Walloon programs - Fisrt DoCA
CETIC budget: €170,240
Start date: 1 January 2011
Duration: 48 months
Contact: sebastien.dawans@cetic.be



SMARTER AIRBORNE TECHNOLOGIES

The SAT project is developing new technologies for aircraft and smarter airborne systems. This project puts CETIC at the forefront of innovative research to support incremental and recertification processes, with a view to reducing the high costs of complying with the safety-critical aeronautics standards.

OBJECTIVES

The goal of the SAT project, coordinated by Thales Communications Belgium, is to develop new technologies for smarter aircraft systems. The project is composed of five parts. CETIC is coordinating the Certif_2 sub-project which aims to improve certification following the critical embedded software standards RTCA DO-178B (or 178C) and equipment (RTCA DO-254) systems. The focus of research is on incremental certification in a product line context using models-oriented techniques both in terms of process and variability modelling.

RESULTS

CETIC's work is focused on coordination, requirements gathering, integration and validation of the Certif_2 sub-project. A process model of incremental certification was produced and articulated on three key aspects: a variability model, certification process workflow and safety objectives. A tool has been developed to effectively support the incremental certification process. It is deployable in both commercial and open source tool chains.

ADDED VALUE

Certification costs for enforcing safety standards applicable in aeronautics are very high and can increase development costs by up to 150%. Moreover, this extra cost does not decrease when the system needs to be recertified to address the needs of new clients. The incremental process proposed will help Walloon companies to develop efficient reuse strategies and result in substantial savings, in turn improving competitiveness and providing better access to key markets.

- AEROSPACE ■ SOFTWARE CERTIFICATION ■ SOFTWARE PRODUCT LINES
- STANDARD ■ SOFTWARE AND SYSTEM ENGINEERING

Partners: UNAMUR-PRECISE, Multitel, UCL-ICTEAM, Thales Alenia Space, CISSOID, Thales Communications Belgium, M3 Systems Belgium, Gillam FEI, Dardenne, Barco Silex, ULg IPNAS

Type of project: Competitiveness clusters - Skywin

CETIC budget: €321,166

Start date: 1 September 2010

Duration: 48 months

Contact: christophe.ponsard@cetic.be



Creative Wallonia

LIVING LAB BY CREATIVE WALLONIA

The Creative Wallonia initiative places creativity and innovation at the heart of Wallonia's economic development. In this context, the Living Lab concept is a laboratory for open innovation. Beyond the simple validation of concepts by mere consumers for new products and services, the Living Lab is a place for the appropriation of new technologies and the emergence of new usage scenarios where users/citizens become actors and contributors.

OBJECTIVES

As part of the Creative Wallonia initiative, CETIC has been appointed to coordinate the implementation of two Living Lab pilot projects, the first of their kind in Wallonia.

The Living Lab places the user at the heart of the co-creation concept to design and develop products and/or innovative services in order to better meet society's needs and expectations.

RESULTS

The positive outcome from different Living Lab initiatives around the world led to a reflection on the value of implementing such dynamics in Wallonia and raise the region's innovation capacity.

In 2013, CETIC launched a call for proposals to fund two Living Lab pilot projects. These two pilots will be centred either on the eHealth theme or on the Open Domain one. On the one hand, eHealth is key to addressing Wallonia's upcoming societal challenges. The focus is on telemedicine, on technologies and process enhancing the autonomy of elderly people, and on the sharing of medical data. On the other hand, Open Domain aims at experimenting with usage scenarios for new standards, practices or innovative technologies.

ADDED VALUE

Through the deployment of the two Living Lab pilot projects, CETIC will enhance its expertise in open innovative technologies and co-creation methodologies. CETIC will ensure the knowledge transfer towards local businesses for integration of co-creative concepts and technological innovations into their process.

- INNOVATION ■ PROOF OF CONCEPT

Type of project: Walloon programs - Creative Wallonia

CETIC budget: €1,250,000

Start date: 1 January 2013

Duration: 2013-2016

Contact: berengere.fally@cetic.be