CELTIC NEWS

Telecommunication Solutions

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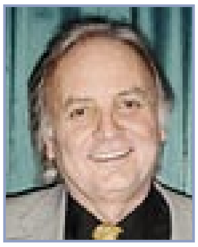
EDITORIAL



Dear reader,

Celtic has just closed its 6th call for project proposals. This year, we received 15 full project proposals, totalling a requested budget of around 121 million euro and an effort of about 1,250 person years. According to Celtic processes, these proposals are currently under technical review. The labelling of the accepted proposals will be done in November 2008.

In this issue we will focus on the processes and tools that Celtic provides for the projects to assure that the work is progressing according to plan and will achieve the expected quality. The additional work required for this quality assurance is rather low but, nevertheless, very efficient. Public Authorities who provide the public funding also rely on the quality assurance Celtic provides.

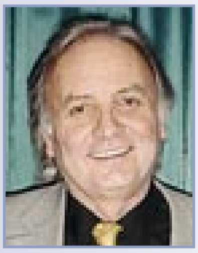
Peter Herrmann, Celtic Programme Coordinator, provides a summary on Celtic's rather successful project situation.

Again, we give successful Celtic projects a platform to present their project work and project achievements. For the Eurescom mess@ge cover theme in this issue, three more Celtic projects – DeHiGate, HNPS and FT-PTC – provide an overview of their research work on public safety.

Heinz Brüggemann
Director Celtic Office

Celtic project quality assurance

Processes and tools for good project quality



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In complex projects with international participation it is not always easy to manage resources and monitor the progress of the work according to plan. Project participants and Public Authorities require, however, that running projects are carefully monitored, important deviations are detected, and possible problems in a project are solved at early stages. Celtic provides a number of processes and tools that assure a smooth implementation of the projects to guarantee that public funding for the project will be used as planned with the results expected.

Quality assurance processes

Quality assurance in research projects needs to focus on different aspects than quality assurance processes in production lines where standardised quality control has a direct impact on the quality of the product. Quality of a research project is often not directly measurable by its final "product", e.g. usefulness for new products or possible impact on business or new jobs. A high-quality project is classified by its work organisation, timeliness and completeness of results as intended, agreed, and planned by the project team.

The Celtic processes for quality assurance in research projects comprise the following steps:

1. Project definition and initial proposal assessment
2. Monitoring of project progress
3. Quality reviews and intermediate assessment
4. Final assessment

Project definition and initial assessment

One of the most crucial aspects is a careful definition of the project to assure that the project team understands how work will be organised, structured and carried out under clearly defined responsibilities and dates. To assure the quality at the initial phase of a project, each project proposal, before it is selected as a Celtic project, will be reviewed by a group of experts.

Monitoring of project progress

Once a project has received the Celtic label and the set-up process has been finalised, the project work can start. For international projects with widely distributed work teams, a regular and transparent monitoring of the project's progress is essential to detect gaps, delays, or other problems at early stages. Monitoring is generally performed via regular reporting, meetings, or audio/video conferences.

Quality reviews

Celtic carries out two important quality reviews:

- Mid-term review (MTR)
- Final review (FR)

The mid-term review is carried out by several experts from the group of experts. It is very important for the intermediate assessment of the project to detect deficiencies or critical variations early in a project and to give recommendations and clear guidelines for the continuation of the project, in order to assure that the planned results will be achieved. The final review provides a picture on the achieved quality of the results and gives recommendations how they could be further used.

Final assessment

The final assessment is, generally, performed by the Celtic Office some time after a project has been finished. At the final assessment, we will particularly investigate and evaluate the further use of the produced results and the impact of the results on new products, new business, or new jobs.

Project management tools

In order to enable projects to monitor their progress and achieve high-quality results, the Celtic Office provides a set of specifically designed and proven tools, most of them at no additional cost to the project.

These tools are all part of the widely used EuresTools suite of project management tools, which was developed by Eurescom, the R&D management company which also runs the Celtic Office. Particularly important and useful for quality monitoring and assurance are the following EuresTools modules:

- EuresTools Reporter; an easy-to-use Web-based reporting tool
- EuresTools Audio-Conferencing
- EuresTools Mailing-List
- EuresTools Wiki

Besides these tools, which are cost-free for Celtic projects, a number of useful additional tools are available at a service fee:

- EuresTools Versioning, which is a secure implementation of the Open Source tool Subversion
- EuresTools CMS, a secure and customised implementation of Typo3
- EuresTools Web-Conferencing for video-conferencing and application sharing.

Further details on the EuresTools modules are available on the Web at *www.eurescom.eu/EuresTools*.

Conclusion

Efficient processes and easy-to-use tools are essential for an efficient quality assurance of Celtic projects without burdening the projects too much with additional work. Celtic's quality mechanisms have proven to be effective and successful in terms of good project results. They are very appreciated by projects and Public Authorities who trust Celtic to monitor their funded projects and to assure that public money is well spent.

Celtic project situation

Set-up of Call 5 projects

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There are currently 32 running projects from the Celtic calls 3, 4 and 5, and 30 projects from the two first calls are terminated. Most of the Call 3 projects are also heading for their final review and will finish soon. Some of the Call 4 projects have already had their mid-term review, but most of them will be realised in the coming months; the Call 5 projects are just starting. There are currently 12 running projects and 5 more that have good prospects to start this year or early next year. The set-up phase after a project has received the Celtic label until the project start is still a crucial period, where the funding agreements with the Public Authorities are negotiated.

Since the start of Celtic there has been a high percentage of labelled projects that could finally not start, which was in most cases due to insufficient public funding. This success rate was increased, reaching a quite good value of 72 % in Call 4. The final result for Call 5 is not yet known, but it is already clear that it will only be in the range of 60 %. The reason for this is the success of Call 5 that has reached for the first time a total budget of 215 million euro for all labelled projects. The consequence is that the available budget in some countries was oversubscribed by a factor of up to 3 in Finland and in France, generating a strong competition between projects. If at the end 17 projects will be running, this can still be considered as a reasonably good result.

Cross-national funding process

The main challenge, however, remains the coordination and synchronisation of the funding decisions in different countries. The Celtic label is given for the quality of a whole project, but the national funding decisions are often taken exclusively on the national impact for the national sub-consortium. It is understandable that national tax money should have the highest possible benefit in the country of the tax payers. In the case of labelled Celtic projects, this could, however, have the consequence that a project receives green light in one country, but other countries may decide to fund a different project or to delay the decision by several months. In the best case, this delays the start of the project, and in the worst case, the project looses all international partners and must stop, because it does not comply any more with the EUREKA rules. In the set-up phase of Call 5, the Celtic office has started to communicate on a regular base with the Public Authorities of the most active countries in Celtic. The goal is to increase the awareness about the progress of the negotiation in other partner countries and to try to favour more coherent funding decisions. The feedback on this was quite positive, and it may have helped for a few projects.

However, it remains true that whoever grants the money has also the power of decision, and the cross-national coherence is obviously only one of many other parameters for the decision.

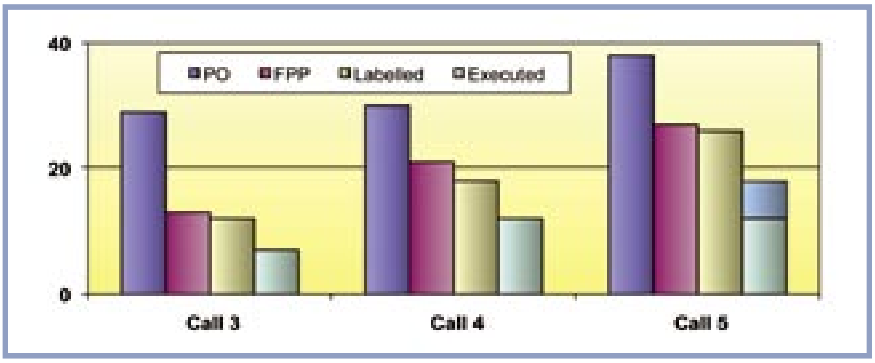

Figure 1: Number of current Celtic projects from Calls 3-5

BOSS

On-board wireless secured video surveillance

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The purpose of the BOSS project is the design and prototype development of an efficient railway communication system. This system is aimed to support the high demands of an audio/video surveillance system in a rolling train from a control centre on the wayside, but also to address related issues, such as predictive maintenance.

Approach

The BOSS project is developing a communication system relying on an IP gateway placed inside a train to enable the communications both inside the train, for communications inside carriages and for mobile passengers and controllers (e.g. WiFi links), and outside the train, mobile in the terrestrial reference frame, with a link towards wireless base stations (e.g. WiMAX, HSUPA links). Consequently, working on a dual mobility level, the BOSS project works to guarantee a differentiated Quality of Service for the different targeted services.

Due to the bandwidth limitations in wireless communications and the large amount of data generated by a set of surveillance cameras, hardly analysable by an operator, a fair share of the BOSS technical work is done on the adaptation of video surveillance applications. This is done not only to robustify the multimedia data but, more importantly, to improve behaviour analysis and audio processing tools for abnormal events detection. Detection of such events will generate alarms to attract the attention of the operator in the control centre (PCC) but will also be directed to controllers on-board trains for immediate action. Figure 1 presents the overall BOSS system functional architecture, from data acquisition to display towards the control centre or controller while passing by alarm processing, adaptation to the transmission conditions (including intelligent transcoding of the video stream for best perceived video quality at the reception) and transmission over the mobile IP links.

Specific additions, such as the restriction of access to the audio/video surveillance streams to authenticated users, necessary

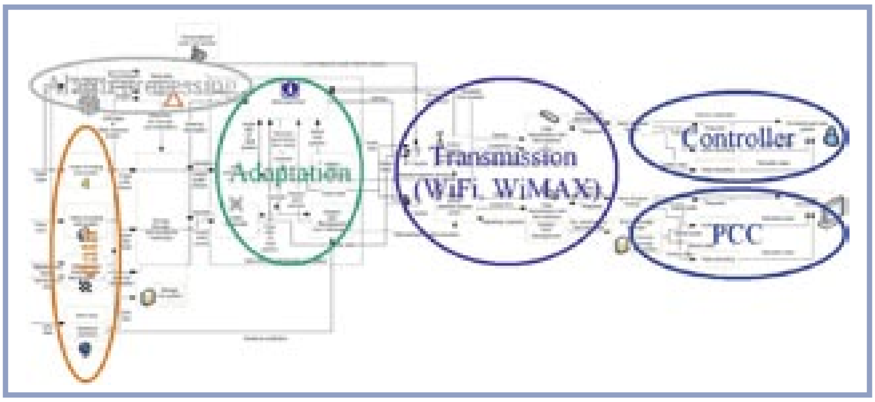

Figure 1: BOSS system – functional architecture

Figure 2: BOSS simulation chain with dual mobility and video display

as per national regulations, is also being considered via use of near-field communication (NFC) authentication devices by the controllers. It is also to be noted that other traveller-oriented services, such as Internet access, travel information services or video on demand, could also be integrated in the BOSS framework via an adapted level of service management.

First results and achievements

The functional architecture has been developed into a full communication architecture used in an OMNeT++ discrete events framework. It is enriched all through the project lifetime by the modules and algorithms developed within the project's technical packages on radio communications, signalling, adaptation to impairments, efficient multimedia compression, and abnormal events detection.

The OMNeT++ simulator is a key element to ensure firstly validation of the system before prototyping, secondly establishment of initial working settings for the demonstration phase, and thirdly measurement and assessment of techniques that will not be realistically implantable in the BOSS demonstrator. The OMNeT++ simulator is illustrated in figure 2, where the two mobility levels (the train on its rails and the controller in his carriage) are displayed together with the visual rendering of the video transmission on one window towards the control centre (PCC) through the outdoor WiMAX/HSUPA link and towards the controller through the indoor WiFi link.

Field demonstrations

A first field campaign was carried out in April 2008, during which audio/video acquisitions of different events played by team actors have been performed. The BOSS approach and the validation of the platform will be demonstrated in the first quarter of 2009 under real conditions in a Civia train operating on the RENFE Cercanias line from Atocha train station.

Consortium members

The BOSS consortium consists of THALES Communications France, Alstom-Transport, SNCF, INRETS, UPMC (France), UCL, BARCO-SILEX (Belgium), TELEFONICA I+D, Arteixo-Telecom, INECO (Spain), BME, E-GROUP (Hungary).

For further information, please visit the BOSS website at
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ReD

Reaction after Detection

Due to the widespread use and increased reliance on telecommunication and information systems, the global Internet has become an attractive vehicle for service delivery. Unfortunately, there is an increased interest of malicious entities for IP-based attacks, as shown by the large number of published vulnerabilities and publicized successful attacks on large organisations. The RED project aims to provide an advanced single management console for security incident detection and reaction management for fast reaction on detected threats.

Context and objectives

Currently, the Internet is an attractive means for service delivery. Network operators and providers are supplying new services, such as voice or television based on the Internet Protocol (IP). This has also increased the number of IP-based attacks on network systems. To address the evolution of security incidents in current communication networks, it is important to react quickly and efficiently to an attack. This reaction can range from blocking the traffic to defining new security policies that solve the problem if they are applied while the attack is happening.

The ReD project is designing and developing solutions to enhance the detection/reaction process, improving the overall resilience of IP networks to attacks by embedding means to enrich the alert with better characterized information, and additional information about the origin and the impact of the security incident.

Types of reactions

To achieve its objectives, ReD proposes three different types of reactions:

- **Immediate**, which is an automatic reaction with a diagnosis based on the capabilities embedded in the device.
- **Short-term**, where the diagnosis is done with a limited and local vision of the monitored information system.
- **Long-term**, where the diagnosis is done with a global vision of the monitored information system. The reaction gives the ability to modify the security policy of the system for solving the problem temporarily or permanently.

The goal of the immediate and short-term reactions is to contain the impact of the security incident and increase the time available for diagnosis, which results in more accurate reactions.

ReD architecture

To provide the detection and reaction functionalities, the ReD architecture is based on:

- **ReD node**, which gathers alert management, reaction management and policy-based configuration management capabilities.
- **ReD security console**, which provides to operators the functions of security view of the system, reporting tools and decision support.

The ReD node is connected to the global security console to ensure a coherent vision of the reaction process.

The ReD node (see figure) is composed of the following elements:

- ACE (Alert Correlation Engine), which receives alerts from network nodes and enhances the detection of attacks by combining several diagnosis combinations.

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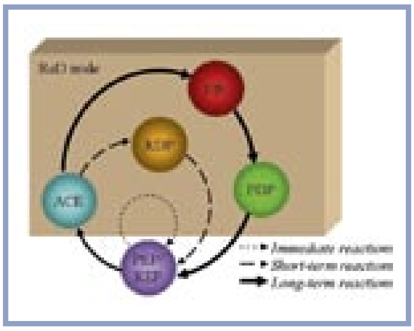

Figure: ReD node – overview

- PIE (Policy Instantiation Engine), which receives the information about attacks from the ACE and instantiates security rules to react to the attack in a long-term reaction loop. These security rules are specified using the OrBAC (Organization Based Access Control) security model.
- PDP (Policy Decision Point), which receives the security policies defined by the PIE and deploys them in the enforcement points.
- RDP (Reaction Decision Point), which receives the information about attacks from the ACE and decides a reaction in a short-term reaction loop.
- PEP/REP (Policy Enforcement Point/Reaction Enforcement Point), which enforces security policies provided by the PDP and reaction provided by the RDP. It also performs an immediate reaction.

The three types of reactions will be differently activated: immediate reactions are directly decided by the PEP/REP, short-term reactions are decided by the RDP based on the information provided by the ACE and without instantiating new security policies, and finally, long-term reactions are decided by the PIE, generating new security policies based on the ACE alerts that are passed to the PDP to deploy them in the PEPs.

Conclusion

The ReD architecture with the three reaction loops will be implemented for use cases which are representative of telecom operator contexts, like VoIP. The ReD node components will be implemented, and some IP attacks will be instantiated to activate reactions varying from automatic, predefined reactions to reactions that imply the reconfiguration of a security policy and its deployment. The security console will allow managing the attack detection and reaction process in a single view. A ReD demonstration will be performed during the CELTIC Event 2009 in Paris.

Further information is available on the project Web page at *www.celtic-initiative.org/Projects/RED*

CARLINK

Advanced Wireless Vehicle Networking Platform

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Increasing amounts of traffic, congestion, pollution, accidents and climate change have created a growing need for advanced real-time traffic-related information systems and services. Safety and mobility can, however, be jeopardized by poor highway design and construction, or by operating procedures which allow unsafe driving conditions, e.g. construction work zones, incident management, or response to emergencies caused by adverse weather. CARLINK (Wireless Platform for Linking Cars) has developed an intelligent wireless traffic service platform between cars with roadside wireless transceivers.

The main outcomes in the three participating countries (Finland, Luxembourg and Spain) are the platform, real-time local road weather, traffic management, and urban information broadcasting/sharing. Various additional applications, like accident warnings and traffic intensity information for route planning can and will be integrated into this system.

The platform is designed to provide a basis for a wide range of commercial and governmental wireless traffic and safety services. The platform itself is the key element, but the various services created for the platform in the participating countries have an important role. These services offer different ways of using and exploiting the platform efficiently and showcase the platform towards the consumers. It is important to raise the interest of end-users to invest on the platform and, furthermore, to entice the vehicle industry to integrate platform equipment into their vehicles. For this, there is the need to promote some key applications and services that are considered both interesting and useful for the end-users. The project does not cover a wide range of alternative services but, instead, focuses on a few key services that are expected to promote the applicability, usefulness, and necessity of the platform.

The local road weather service (RWS) collects observed weather data from vehicles and uses these together with weather information from other sources to generate comprehensive local road weather forecasts to be forwarded back to cars. The incident/emergency warning service uses vehicle data to generate warnings about exceptional traffic condi-

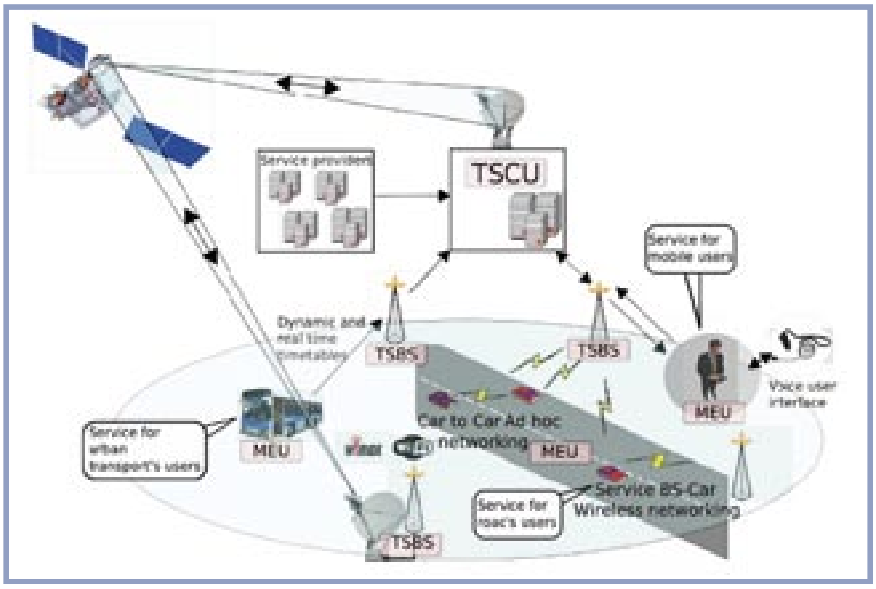

Figure: Carlink platform

tions or accidents. The traffic management service will generate traffic logistics data for the public authorities. Finally, the multimodal transport service delivers commercial-like travel data to users on the move. The platform is shown in the figure.

It is divided into the Traffic Service Central Unit (TSCU), the base station network with the Traffic Service Base Stations (TSBS), and Mobile End Users (MEU) with ad-hoc connectivity and non-continuous backbone network connectivity. The MEUs form a wireless network, communicating in an ad-hoc manner, typically when two cars are passing each other. When passing a TSBS, MEU gets up-to-date traffic platform information. The TSBS receives regular updates from the TSCU, located in the fixed network. The MEU also transmits data to/from TSCU over a lower-capacity connection, e.g. GPRS, when critical weather, warning, incident or accident information emerges. The vehicle data are used to enhance the services of traffic/traveller management, local road weather and accident warnings. These data are delivered back to vehicles almost in real time.

Outlook

CARLINK provides benefits to several different stakeholders, such as the car industry, telecommunication operators, drivers, public transportation, truck operators, and basically all road users and road maintenance authorities. It also provides new safety features to cars. CARLINK's new kind of telecommunication service will bring new business opportunities to telecommunication operators. Equipment manufacturers, municipalities, and commercial companies have new types of services to offer. Platform equipment development will bring new kinds of products for the electronic component industry. Advertising and value-adding services can generate new private business through the platform.

Further information is available on the project Web page at
www.celtic-initiative.org/Projects/CARLINK

IMPRINT

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About Celtic

Celtic is a Eureka cluster, which initiates and runs privately and publicly funded R&D projects in the field of telecommunications. The cluster, which runs until 2011, is supported by most of the major European players in communication technologies. Celtic projects are focusing at telecoms networks, applications, and services looking at a complete system approach. The size of the Celtic budget is in the range of 1 billion euro. Celtic is open to any kind of project participants from all Eureka countries.