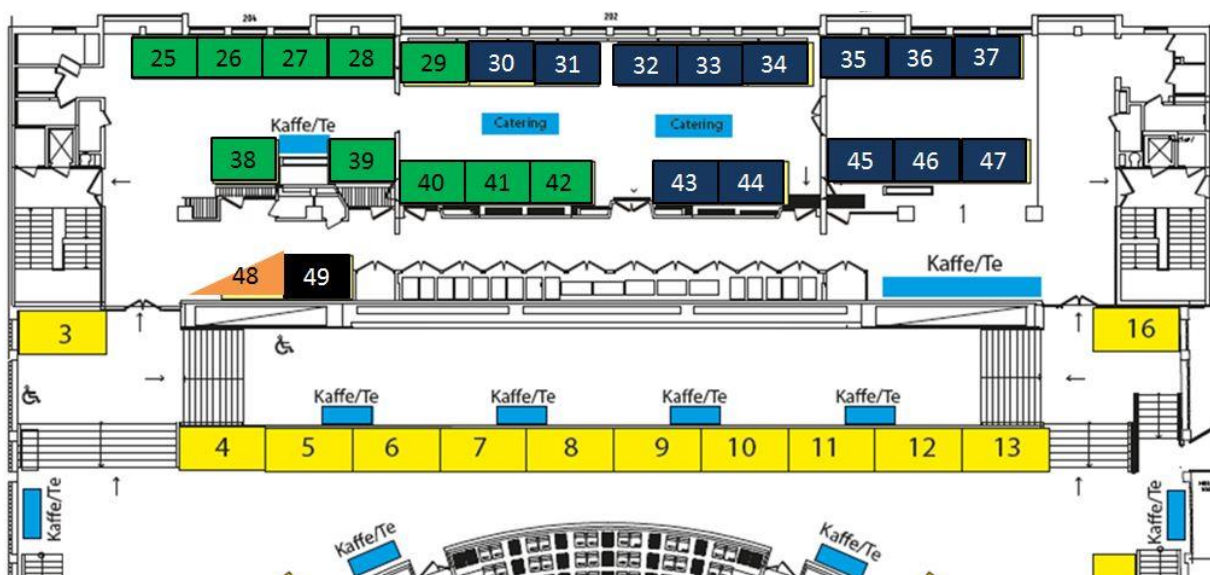


Innovation Week Stockholm 2016

Celtic-Plus Demo Descriptions:

4KREPROSYS	Booth 32	From 26 April
ACEMIND	Booth 43	From 26 April
CoMoSeF	Booth 34	From 26 April
HFCC/G.fast	Booth 11	From 26 April
HIPERMED-E3	Booth 44	From 26 April
Soogreen /OperaNet2	Booth 35	From 26 April
TILAS	Booth 33	From 26 April
CONVINcE	Booth 37	From 28 April
MERCO	Booth 12	Celtic Booth
MITSU	Booth 46	From 28 April
NOTTS	Booth 47	From 28 April
SAN	Booth 36	From 28 April
SASER	Booth 30	From 28 April
Seed4C	Booth 45	From 28 April
SIGMONA	Booth 31	From 28 April
UPSC	Booth 12	Celtic Booth





Booth 32

Title: Live 4K HEVC Encoder & Wireless HD Link

<https://www.celticplus.eu/project-4kreprosys/>

Contact: Dominique Grillet, dominique.grillet@ampvisualtv.tv



4KREPROSYS provides enabling technologies for indoor/outdoor video monitoring and analytics in smart cities. A cost-effective production chain of real-time 4K video with new congestion-proof wireless techniques brings high-quality video services anywhere and anytime in crowded areas. Applications include surveillance, detecting/alerting events of interest, and analyzing streams of people and traffic

This demonstrator showcases High Efficiency Video Coding (HEVC) and Software-Defined Radio (SDR) technologies developed by Tampere University of Technology (TUT) and Siru Innovations in the 4KREPROSYS project. HEVC standard halves the bit rate over the previous video coding standards and SDR technologies enable congestion-free wireless transmission of HEVC video.

In the demonstrator, HEVC compression is performed by Kvazaar which is currently the number one open-source academic HEVC encoder worldwide. Wireless transmission relies on Siru's SDR20 transceiver which is performance scalable, multi-touch, and portable platform for next-generation radio designs. These solutions are being developed for ultra-low delay and high-quality 4K TV content production and delivery in crowded areas.

The demonstrator processes two video streams in parallel: A) Wired 4K Video; and B) Wireless HD Video. In case A, the raw 4K video is shot by 4K action camera, captured by HDMI card from the camera, encoded in real-time by Kvazaar on Dual Xeon processor, and played back by a laptop via wired IP link. In case B, the HD video shooting, capture, and encoding are done as in case A, but now the wired transmission is replaced by Siru's SDR wireless link before playback. The encoding process is also monitored in real-time by Kvazaar Visualizer.



Booth 43

Advanced Convergent and Easily Manageable Innovative Network Design

<https://www.celticplus.eu/project-acemind/>

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The ACEMIND project intends to provide a set of consistent solutions for enhancing the management of local networks in home and small enterprises typically constituted of some tens of devices connected to each other via a set of wired and wireless technologies. The deployment of such networks has been intensive in Europe in the last decade and will continue in the future. However common end-users still suffer from complicated installation, operation or maintenance.

The goal of the ACEMIND project is to enrich this initial concept with new functionalities and services such as security starter pack, senior care or green Home approach. Another target is to propose new product using new technologies links, for instance LiFi. Light Fidelity (Li-Fi), which relies on light to deliver data and indoor positioning, could be a candidate technology, able to provide pervasive connectivity or outside street lights in Smart Cities as a new communication channel. Then, with a user friendly HMI (Human Machine Interface) it will be possible to manage large range of services such as energy management, multimedia devices, home security and senior care.

The ACEMIND consortium gathers major European industrial actors in the local networks market as well as leading universities and institutes. A successful project will provide significant progress on the Quality of Service for hybrid network users. This will boost market opportunities for European actors in the communication industry.



Booth 34

Co-operative Mobility Services of the Future

<https://www.celticplus.eu/project-comosef/>

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The participants of the CoMoSeF project have been able to develop and deploy services & systems, based on the common CoMoSeF architecture, that provide accurate and reliable road weather information, warnings and forecasts, systems for analysing and forecasting the condition of the road surface, visibility, weather, air quality, friction monitoring and friction forecasting etc.

CoMoSeF has created, implemented and deployed co-operative mobility solutions, devices and applications, supporting the objectives of the European Commission's ITS Action Plan and national ITS strategies. The European services were piloted in Finland, France, Luxembourg, Romania, Spain and Turkey. There was also a pilot in the Republic of Korea as well as an important external pilot during the Sochi Winter Olympics in 2014.

The driver is now able, for example in foggy weather situations, to have a clear view of the street and get warned of pedestrians crossing the road ahead via his mobile device. Traffic authorities are now able to exchange their traffic information directly with the road participants, and vice versa. Taxi fleets in Finland use the CoMoSeF equipment, for example, to distribute their information about traffic jams for cost-reduced trip planning to the next client. Buses from Otokar in Turkey are equipped with mobile devices updating the driver with speed recommendations and general traffic information. A pilot use case in Luxemburg focused on the car sharing market and traffic management in cooperation with a local radio station to exchange data on traffic jams.

In our demonstration we will present the related results from the Spanish, French, Finnish and Luxembourgish partners of the project and show how they are all contributing data to the collective CoMoSeF platform.

Consumption Optimization in Video Networks

<https://www.celticplus.eu/project-convince/>

Contact: Raoul Monnier, raoul.monnier@thomson-networks.com



The CONVINcE project showcases five demonstrations:

- Remote gaming: Energy savings using computational offloading
A working prototype for remote gaming based on GamingAnywhere is shown. The goal is to present a platform for measuring power savings in terminals and compare the consumption to State Of The Art consumption of gaming applications.
- Video streaming: Energy consumption measurements for various types of video encryption
A video is streamed from a server to an Android application. The application displays instantaneous energy consumption figures. The user can choose different security and digital rights settings and see how this affects performance, energy consumption and expected battery lifetime.
- Energy savings using real time energy measurements during software development/debugging
This demonstration shows an energy consumption analysis tool for energy optimization of devices and applications. It enables product developers to quickly understand the energy consumption of the products that they are working on, with the goal of making more sustainable and more energy efficient devices.
- Video processing: Impact on energy consumption in terminals
This demonstration aims at explaining that moving to a better video compression technology takes only a little extra power and that using parallelism for decoding can help to save energy.
- Energy-efficient routing and interface selection mechanism in access and core network
The aim of the demonstration presented in the video is to show how an energy-aware routing approach can reduce the overall energy consumption in access and core networks.



Booth 11

Hybrid Fibre-Copper connectivity using G.fast

https://www.celticplus.eu/project-hfcc_g_fast/

Contact: Per Ola Börjesson, per.ola.borjesson@ericsson.com



G.fast/ Fibre To The Distribution Point

The HFCC-G.fast project developed the technology to realize FTTPD (Fibre To The Distribution Point) with a Gigabit service in a cost-effective way. This is done by deploying DPUs (Distribution Point Units) and reusing the last few hundred meters of the existing copper loops.

During the HFCC project ADTRAN developed a prototype of a G.fast DPU which can serve 8 subscribers with internet speeds of multiple hundreds Megabit/s over a distance of a couple of hundred meters. ADTRAN's DPU prototype is shown in live operation using a real telecom cable of 100 m length, demonstrating the transport of data traffic. This prototype is the predecessor of ADTRAN's actual G.fast product series.

G.fast/Cloud Ran Demonstration Video

This demonstration shows G.fast being used as part of the front-haul technology between an LTE Broadband Baseband Unit (BBU) located in the core network connected to a Remote Radio Headend (RRH) located within the home.

The G.fast DPU in this demonstration is actually reverse powered over a single copper pair connected to the CPE equipment located inside the home. The G.fast modem in this case takes the form of an SFP unit plugged into a simple media converter and the reverse powering equipment takes the form of a separate stand-alone powering block.

End-to-end demonstration is provided by a video server connected to the BBU whilst in the home, a smart-phone displays the HD video content being transmitted within the home over LTE. In addition, a traffic monitoring unit shows the bandwidth being used by the video traffic in the home.

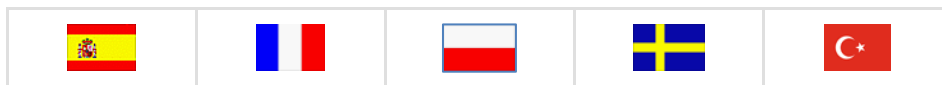


Booth 44

High Performance Telemedicine platform

<https://www.celticplus.eu/project-hipermed/>

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"HIPERMED/E3 booth will demo HIPERMED current on the market solutions like Professional to Professional and Professional to Patient Video Conference solutions as well as E3 improvements and developments including:

- PROMEtEE demo (E3 Improvement on HIPERMED Developments) « **PeRceptiOn** utilisateur pour les usages du **MultimÉdia** dans les applicaTions mÉdicalEs » is a **living lab** that allows under a normalized environment (ITU BT 500) the realization of subjective tests on medical videos and images, and is a key element in validating E3 developments
- Face to Face Professional to Patient Video Conference solution (E3 Improvement on HIPERMED developments)
- Necklance and wristband sensing relying on a rule-based system
- Video Indexing and Summarizing offering professionals a tool to remotely monitor patients as well as navigate tru video content faster
- Video sharing tool, allowing professionals to share videos faster even with low bandwidth connections
- Video Conference Solutions for both Professional to Professional, Professional to Patient and Patient to Patient.
- Mobile application to allow chronically disease patients to interact with their tutor and other professionals who will promote a better quality of their live.
- Mobile application that provide customer plans, information and reporting capabilities for HealthCare Professionals on the move

Mediated Effective Remote Collaboration

<https://www.celticplus.eu/project-merco/>

Contact: Morten Fjeld, fjeld@chalmers.se



Metaplan is a coordinated brainstorming method that employs traditional pen, Post-it note and whiteboard. Despite being used in many teams and organizations this method has still obvious drawbacks in supporting recording and playback, as well as the limitation of remote participation. In this demo, we illustrate our early prototype that can digitally support coordinated brainstorming methods such as Metaplan.

Using our system, participants of a brainstorming session can input their ideas digitally via mobile devices or smart pen and then perform idea discussion on a smart board with rich content manipulation gestures. On the one hand, this system retains the advantages of the traditional setting such as natural feeling when inputting ideas with pen and paper as well as “free riding” due to anonymity of the idea’s creators. On the other hand, the system also allows users to keep track of the history of the brainstorming session and play back from any point in past or allowing remote users to actively participate the session. This early-stage prototype is a component of a larger infrastructure that we are building to envision future collaborative environments.



Booth 46

Next Generation Multimedia Efficient, Scalable and Robust delivery

<https://www.celticplus.eu/project-mitsu/>

Contact: Piotr Pawalowski, astagor@man.poznan.pl



The demo presents the capability to continuously monitor the QoE degradation within the multimedia delivery system, one of the crucial achievements of the MITSU project. For that purpose, the live video stream is transmitted via the MITSU demo installation, consisting of a security camera for acquisition, an audio-video processor for recoding, a wireless network for transmission and a mobile device for watching.

Both the processor and a mobile device are accompanied by a QoE probes for monitoring the quality of the input and output streams. The viewer is able to assess the level of quality degradation, since the input and output streams are presented on separate screens, along with their individual no-reference QoE metrics. The presented installation is a reference setup meant for broadcast-level market players that would like to gain a competitive advantage by introducing a continuous QoE control and management system that would allow maximizing the viewers' satisfaction within the allocated bandwidth slot.



Booth 47

Next generation over-the-top multimedia services

<https://www.celticplus.eu/project-notts/>

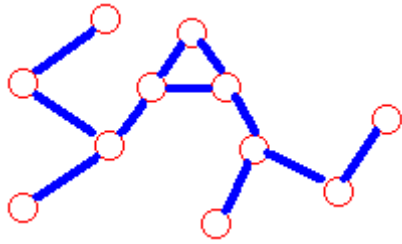
Contact: Antonio Cuadra-Sanchez, acuadra@indra.es



NOTTS project has defined the OTT architectures and designed an OTT content distribution platform, setting the technical bases of the overall project. Afterwards, in order to ensure the Quality of Experience (QoE) of the system, control and monitoring tools for OTT services have been developed. In addition, user demand consumption patterns have been analysed in terms of OTT traffic analysis. Besides, another remarkable achievement was the reduction of latency for live OTT services. All in all, NOTTS has developed an ecosystem that allows a service provider to deploy its own OTT service while granting the user good levels of QoE at low cost

We present the main achievements regarding the ecosystem for assuring OTT content delivery:

- **Pop-up CDN with smart monitoring and management:** This demo will showcase smart on-demand content delivery services based on the location and resource needs. Our software solutions allow dynamic scaling and management of CDN services by utilizing quality information from the network and end-users. The solution improves the user experience and reduces the usage of network resources by bringing services closer where the actual demand is.
- **QoE based Server Selection method for Adaptive Video Streaming:** This demo focuses the server selection layer based on existing user's feedbacks, and developed rate adaptive method dynamically adapts the video quality for OTT platform that regulates the user's QoE.
- **Latency reduction for live OTT services:** This demonstration focuses on the optimization of OTT latency to reduce the delay between OTT and terrestrial (DVB-T/T2) live services.
- **OTT User behaviour:** Understanding traffic and content demand patterns is a key first step in managing resources efficiently while striving to maintain high QoE to keep the end users satisfied. In this demo we will show the innovation in OTT User demand patterns across Europe performed within the scope of the NOTTS project.



Booth 36

SAN

Survivable Ad Hoc Networks for 4.5G and beyond

<https://www.celticplus.eu/project-san/>

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SAN architecture includes four components:

- Professional Mobile Radio Wireless Wide Area Network (PMR WWAN): this is the PMR fixed infrastructure. SAN's system is able to be deployed autonomously but in case a PMR fixed base station is reachable, SAN's system is able to connect to the PMR fixed network. SAN WWAN backbone is constituted by meshed ad hoc SAN WAN nodes. This is the core of SAN system.
- SAN Wireless Wide Area backbone: SAN WWAN backbone. The SAN WAN nodes are using a protocol derived from LTE and customized in order to communicate between each other. They form a robust and mobile ad hoc network with ranges that can reach 10km.
- SAN Wireless Local Area Network: SAN WLAN backbone. SAN WLAN backbone is constituted by meshed ad hoc SAN LAN nodes. This is an IP network, hierarchically below SAN WAN node. It constitutes a tactical bubble around each SAN WAN node.
- SAN reconfigurable EE power amplifier for public safety scenario.



Booth 30

Safe and Secure European Routing

<https://www.celticplus.eu/project-saser-siegfried/>

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SASER was a European project joining forces of 69 partners from Germany, France, Finland, Denmark, and the United Kingdom. It targeted to investigate and develop concepts and technologies for a European solution for safe and secure routing in the network with its dramatic traffic growth, which is key for reliability, safety, security and trust of/in future network and the Internet as basis for our daily life.

The first demonstration shows the feasibility of dynamically allocating network resources for LTE Evolved Packet Core (EPC) gateways, leveraging the split of user and control plane introduced by Software Defined Networking (SDN) and hosting the control plane as a Virtual Network Function (VNF) in the cloud. Additionally the Nokia Mobile Guard security appliance is introduced as an application on top of the Packet Data Network Gateway (PGW) SDN controller which detects and removes malware on mobile end devices.

The fast rise of distributed data centres led to a downright bandwidth explosion of inter-data centre connections. ADVA shows in the second demonstration an adaptive 400G transceiver concept for inter-data centre interconnects based on DMT (discrete multi-tone transmission). The proposed system, enabled by sophisticated digital signal processing, requires only simple optical components and can trade reach with spectral efficiency, effectively allowing interconnections with very low cost per bit. The implementation of the demonstrator is based on the ADC/DAC test chips contributed by Socionext.

Socionext main contribution to the SASER program has been the R&D of state-of-the-art, ultra-high speed ADC/DAC test chips covering a broad sampling rate from 55 to 92GSa/s. The test chips feature a high effective resolution (ENOB) and wide bandwidth with very low power consumption processed in 28nm CMOS technology. Additionally a Development Kit (with FW/SW and GUI) has been designed and developed enabling the R&D of specialized higher order modulation formats. This makes investigations into coherent electrical and optical transceiver technologies, systems and test beds for network infrastructures possible and is the key for successful research & optimization work for future 500G/1T communication systems and transport networks.



Booth 45

Secured Embedded Element for Cloud

<https://www.celticplus.eu/project-seed4c/>

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Demo: Modelling, Securing and Automatic Deployment of a (n -tier) web-application in the Cloud

The Seed4C Eureka-Celtic-Plus project focused on end-to-end cloud security with cooperative points of enforcement. Security is unanimously considered as essential nowadays, but it is also known to be cumbersome to enforce in practice. Integrated in the Seed4C project, the core of the Qirinus1 technology tackles this issue with a graphical tool Sam4C to easily model the secure architecture of a Cloud application and automatically orchestrate available security mechanisms.

Based on Seed4C paradigm, Qirinus proposes an unique and innovative solution to enforce all security aspects: Network security, Host-based security, System and Application Hardening, etc. We aim at achieving economic efficiency with adapted measures according to performance criterions, strong security through best practices compliance and audit facilitation. This demonstration will show the modelling, securing and automatic deployment of a n -tier web-application in Openstack. Starting from a simple description made with an user interface, we will pushed it on the cloud. A comparison of a secured and unsecured description will then be made with basic attacks on the application.

¹ *Qirinus* (www.qirinus.com) is a new startup project supported by Inria, member of the Seed4C consortium.



SIGMONA

Booth 31

SDN Concept in Generalized Mobile Network Architectures

<https://www.celticplus.eu/project-sigmona/>

Contact: Jari Lehmusvuori, jari.lehmusvuori@nsn.com



The project defined and evaluated network architectures and functions for virtualization of the 4G (LTE) mobile core networks. The project applied the latest networking and computing technologies and architectures, in particular Software Defined Networking (SDN), Network Functions Virtualization (NFV) and Cloud computing, on the virtualized mobile core networks. The project also studied new opportunities for traffic, resource and mobility management, challenges on network security and monitoring, network management, as well as impact onto cost of the network, value chain and business models. Highlights are shown with three demos.

1) Cloud optimized mobile core evolution with consolidated control plane (Nokia, Finland)

A prototype of a novel cloud optimized mobile core network with Software Defined Networking (SDN) controlled user data forwarding and consolidated mobile network control plane functionality. Flexible scalability provided by cloud computing is demonstrated with stateless transactions supported with subscription state database in the cloud.

2) Virtual mobile network in 5 minutes. Roaming for virtual operators (Aalto University, Finland and Technical University of Chemnitz, Germany)

Virtual mobile network with Cloud Orchestration – OpenStack cloud reduces CAPEX investment and provides flexible network management with energy savings and horizontal and vertical scaling. A mobile network with Network Functions Virtualization is commercially available to deploy a virtual network infrastructure in less than 5 minutes. The demo shows a scenario of a user roaming across geographic locations optimized with OpenStack cloud for redirecting the information flows.

3) Self-configuring and self-tuning multi-domain mobile backhaul network (Nokia, Hungary)

The demo shows how the combination of Self Organizing Networks and Fabric Control utilizing Software Defined Networking (SDN) applied on mobile networks. They provide a 5G ready self-configuring and self-tuning multi-domain mobile backhaul network.



Booth 35

Service-oriented optimization of Green mobile networks

<https://www.celticplus.eu/project-soogreen/>



Optimising Power Efficiency in Mobile Radio Networks 2

<https://www.celticplus.eu/project-opera-net2/>

Contact: Gwénaëlle Delsart, gwenaelle.delsart@orange.com



Optimising Power Efficiency in Mobile Radio Networks 2

The mobile energy optimization set-up at network level is now covering new services for smart cities and smart-grid. The Opera-Net 2 project, ended mid-2015 and focused on the environmental impacts reduction of mobile networks. It succeeded to manage both modelling, hardware and software design in the area of energy, material efficiency, innovating cooling solutions, new power amplifier component, network architectures, off-grid power system and field trials. The demonstration on the booth highlights a hardware liquid cooling solution with heat reuse; in addition it shows an energy efficiency optimization for 4G network with an Envelope Tracking power amplifier combined with a “Smart Frame Filling” software.

Today, mobile networks are witnessing an exponential growth of traffic volumes, linked to new services, especially for smart cities and smart-grid.

The SooGREEN project started mid-2015 is targeting to reduce the energy consumption of the services in various mobile architectures in interaction with smart-grid.

SooGREEN focused on:

- The services energy consumption modelling and measurement,
- The dynamic optimization of the mobile access network and the content delivery,
- The design of an energy efficient Virtualized and Centralized Radio Access Network
- The bi-directional interaction of the mobile network with the smart-grid.



Booth 33

Technology improvements for large scale smart cities deployments

<https://www.celticplus.eu/project-tilas/>

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TILAS Santander demo consists of 10 gas sensing devices fully integrated on the SmartSantander ecosystem (12.000+ sensors already installed on the city) while embedding enhanced TILAS features, such as OTAP and visual impact reduction. The legacy compliance with SmartSantander devices is demonstrated through its integration on Fi-Ware, where all data from Santander sensors is posted (<https://data.lab.fiware.org/organization/santander> --> TILAS traffic sensors). TILAS has also developed a backed for managing the OTAP features (Firmware download, announcement and dissemination) and showing data being posted by sensors.

Paris demonstrator deploys 45 Arduino nodes with cameras in FIT IoT Lab which is large open platform in France. The routing is based on Opportunistic approach and the security is ensured with MQTT and delegated access management.

Interoperability of several security protocols in a multi-hop 6LoWPAN constrained wireless sensor network

- IPsec mode transport in multi-hop meshed network
- DTLS with two handshake modes: PreSharedKey and RawPublicKey



Booth 12

Unleash The Power of SIM

<https://www.celticplus.eu/project-upsc/>

Contact: Rahmi Cem Cevikbas, cem.cevikbas@turkcell.com.tr



UPSC provides a simple framework for mobile application developers to access SIM card functions for securing their mobile applications.

1- Remote Payment:

This is a UPSC security enhanced e-commerce application. The UPSC framework is used to encrypt the Credit Card PIN with the symmetric key on the SIM card.

2- Mobile Signature:

In this demonstration UPSC framework is used to implement a PKI architecture where private/public key pairs are generated on the SIM card. A mobile application retrieves the documents to be signed and uses UPSC architecture for signing. This method provides a solution for multiple document signing since the data is sent through mobile data instead of SMS.