Celtic-Plus
Smart Connected World

Project Information

SIGMONA

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Partners:

AALTO University Foundation, Finland
Applied Research and Development and Innovation Center (ARDIC), Turkey
Argela, Turkey
Avea Iletisim Hizmetleri A.S., Turkey
Budapest University of Technology & Economics, Hungary
Bull, France
CEA LIST, France
Coriant Oy, Finland
ENEO Tecnologia S.L., Spain
Ericsson Telekomunikasyon A.S., Turkey
Exfo, Finland
Innovalia Association, Spain
Montimage, France
Nextel S.A., Spain
Nokia Solutions and Networks kft., Hungary
Nokia Solutions and Networks GmbH & Co. KG
Nokia Solutions and Networks Oy, Finland
Technical University of Chemnitz, Germany
University of Oulu, Finland
VTT Technical Research Centre of Finland, Finland
6WIND, France

Co-ordinator:

Jari Lehmusvuori
Nokia Networks, Finland
E-mail: jari.lehmusvuori@nokia.com

Project Websites

www.celticplus.eu/project-sigmona/
www.sigmona.org

SDN Concept in Generalized Mobile Network Architectures

The SIGMONA project focuses on network architectures and functions for virtualization of the 4G (LTE) mobile core networks. The project applies the latest networking and computing technologies and architectures, in particular Software Defined Networking (SDN), Network Functions Virtualization (NFV) and Cloud computing, on the virtualized 4G mobile networks.

Main focus

Mobile networks are transforming into virtual networks running in Cloud computing environments. Software Defined Networking (SDN) is a technology that enables a new virtualized network architecture with decoupled control and data planes. The project comes up with a Software Defined Mobile Network (SDMN) concept for new software oriented environments as illustrated in figure 1. An SDMN architecture includes virtualized network resources and functions, as well as SDN for the network control. The project provides an insight into the feasibility and opportunities of Software Defined Networking (SDN), Network Functions Virtualization (NFV) and Cloud computing applied to 4G mobile core networks. SIGMONA project also evaluates the limits of performance and scalability of the SDMN. New opportunities for traffic, resource and mobility management are studied. New challenges on network security and solutions for those are addressed. Network virtualization solutions in the mobile transport networks, as well as effects on the network monitoring and network management solutions are in focus, too. The project also investigates the impact onto cost of the network, value chain and business models. The model of open interfaces, the role of standards and related bodies are also addressed.

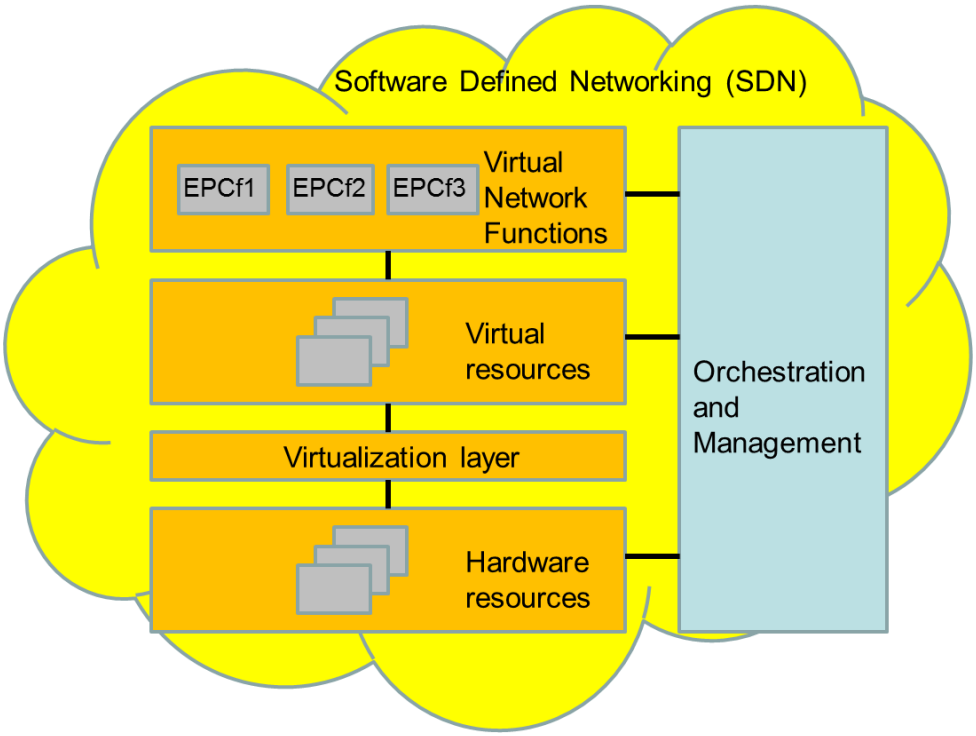

Figure 1: Software Define Mobile Network concept with virtual resources and SDN.

Approach

The project defines novel network architecture concepts for a Software Defined Mobile Network (SDMN). Validating the research concepts with tests of experimental systems is an essential part of the project.. The project models the effect of the virtual networks on the business value chain and the network costs Alignment with the emerging standards on virtual networks (NFV) and contributions are included in the project.

The main phases of the project work are:

- High-level Requirements, Scenarios, Use Cases (1H2013)
- Basic assumptions (2H2014)
- Validation & demo plans (1H2014)
- Software defined mobile network principles and initial architecture (2H2014)
- Validated concepts & Architectures (2H2015)
- Consolidated SIGMONA view and network architecture (1H2016)

Main results

The following main results are published on the project public web pages:

- Consolidated view of SIGMONA Software Defined Mobile Network Architecture
- Network virtualization and control framework of transport networks for SDMN
- Network monitoring in SDMN
- Software-defined mobile network -ready advanced traffic and resource management
- Virtual network mobility management architectures
- Secure mobile architecture
- Life Cycle Cost (LCC) models for transport and mobile network elements
- Analysis of the direct impact of the new network technologies on Regulation
- Business Cases in virtualized Mobile Network Environments

The project also summarizes the key results in White Papers on:

- Techno-economic modelling of SDMN
- Consolidated view on SIGMONA network

The project implements a number of validation systems and test beds on virtualized EPC and SDN networks, some of them as national co-operation activities. The validation systems may also be publically demonstrated as Proof-of-Concept.

The project intends to support standardization of the Network Functions Virtualisation (NFV) by aligning with the standardization activities of ETSI Industry Specification Group for Network Functions Virtualisation (NFV).

The results of the project are published in papers and presentations in Conferences and Work Shops dealing with SDN and NFV.

Impact

The Project contributes to the next major shift in the mobile networks technology, that being the transformation to software defined networking with virtualized functions run in the cloud.

The business and cost models can be used for evaluating the business opportunities in the forthcoming phase of virtualized and software defined networks.

Validation systems on the virtualized (NFV) mobile networks and SDN networks are used in experimentations on these new technologies. They can also be exploited in evaluating the product opportunities for the future mobile networks. The common national test beds or test networks provide value and benefits through cooperation.

The project results may be used to influence the standards for Network Functions Virtualization and SDN for mobile networks.

The project results on the NFV and SDN technologies published as conference presentations and papers will contribute to the positioning of these technologies within the industry and academia.

About Celtic-Plus

Celtic-Plus is an industry-driven European research initiative to define, perform and finance through public and private funding common research projects in the area of telecommunications, new media, future Internet, and applications & services focusing on a new „Smart Connected World“ paradigm. Celtic-Plus is a EUREKA ICT cluster and belongs to the intergovernmental EUREKA network. Celtic-Plus is open to any type of company covering the Celtic-Plus research areas, large industry as well as small companies or universities and research organisations. Even companies outside the EUREKA countries may get some possibilities to joine a Celtic-Plus project under certain conditions.

Celtic Office

c/o Eurescom, Wieblinger Weg 19/4
69123 Heidelberg, Germany
Phone: +49 6221 989 210
E-mail: office@celticplus.eu
www.celticplus.eu

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