SASER-SIEGFRIED

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Partners:

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FH Potsdam, IDL-Interaction Design Lab, Germany
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Project Website

www.celticplus.eu/project-saser-siegfried

Safe and Secure European Routing

SASER-SIEGFRIED is one of the three sub-projects of the CELTIC Plus umbrella project SASER. SASER-SIEGFRIEDs main objective is the analysis and the development of a secure and energy-efficient network architecture. This architecture will include new promising technologies like network virtualization and software defined networking. As a use case a future mobile network based on a lower-layer transport network is in the focus.

Main focus

The project goal is to mitigate security vulnerabilities of today's IP-layer networks and to propose a new architecture for energy- and cost-efficient networks for the time frame 2020.

The following activities will be accomplished to achieve this objective:

Firstly, data transmission will be downscaled as far as possible to lower network layers (physical layer and data layer) to reduce the need of IP routers, which are considered as critical to security. On one hand, this can be realized by adopting technologies such as network virtualization and software defined networking, and on the other hand, by efficient resilience mechanisms, based on flexible and highly available optical systems.

Secondly, security mechanisms for future networks will be designed, based on an analysis of remaining security problems in the IP layer (for example: backdoor and anomaly detection).

Thirdly, the developed technology will be analyzed in the use case of a future mobile network.

Approach

SASER-SIEGFRIED consists of 4 work packages. Work package (WP) 0, "Project Management", is for coordination of all project partners and the alignment of the project activities. In WP 1, "Network Security", the protection of networks against external and internal attacks will be investigated (e.g. backdoor and anomaly detection) and appropriate methods to secure the networks will be developed. The focus is on the analysis of threats and security requirements of the newly defined network architectures evaluated in WP 2. In WP 2, "Reliable Networks", a new architecture and operational concepts of highly secure and reliable transport networks will be developed and evaluated. This includes the analysis of system requirements, system constraints and new technologies like network virtualization and software defined networking. Additionally, multi-layer optimization, resilience mechanisms, total cost of ownership analysis, and identification of system limitations will be part of WP 2. In WP 3, "Safe and secure networks by reliable transport technology", the focus is on the investigation of a reliable and energy efficient transmission technology as a physical basis for the realization of safe and secure telecommunication networks. An important aspect is to avoid electronic signal processing by optically bypassing the routers. That requires a
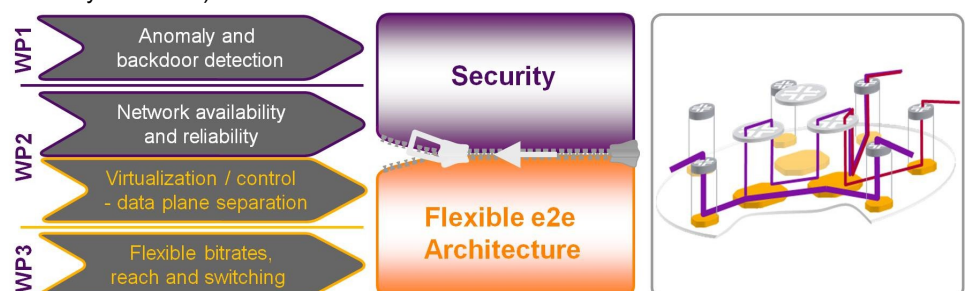
layer 1 with the capability to realize long reach, with high tolerance to distortions and with high flexibility especially concerning the granularity of bandwidth. Therefore, flexible and tolerant modulation schemes will be investigated which should be demonstrated in a lab and if possible additionally in a field trial.

Main results

The most important overall result of SASER-SIEGFRIED will be the specification of a new flexible, energy- and cost-efficient future network architecture including security features protecting against internal and external attacks. Differently to older approaches, the SASER security concept will be a major aspect for the definition of the architecture; not just added once the architecture has been defined. This architecture will be evaluated in the use case of a future mobile network. The most important sub-project results are listed below:

WP1:

♦ Security concept for a new architecture based on software defined networking

♦ Threat and risk analysis for high-speed networks

♦ Examination and development of specialized (semi-) automated tools for backdoor detection

♦ Identification and validation of methods and techniques for traffic anomaly detection in high-speed networks

♦ Demonstrator for analysis- and sensor-platform in the field of anomaly detection

♦ Dashboard/GUI for anomaly detection

WP2:

♦ General architecture specifications (NW virtualization, SDN)

♦ Reference architecture definition

♦ Control and management plane concepts for new architecture (incl. control plane and network element demonstrator)

♦ Network optimization and planning algorithms (incl. resilience mechanisms)

♦ Total cost of ownership studies

♦ Migration scenarios to new architectures

♦ Resilience investigations and comparison (virtual – physical)

WP3:

♦ Specification of flexible modulation schemes (reach, bit rates)

♦ Demonstrator with newest analog digital converter/digital analog converter

♦ Lab demo / field trial: flexible rate transmission 100/200/400 Gbit/s

Impact

Vital European interests in safety and security depend on routing technologies dominated today by non-European companies. The number of cyber-attacks on layer 3 is still increasing. It is of vital interest for the European countries to minimize those risks of interference. Therefore, technologies for safe and secure networks must be developed.

Another important point in today's networks is the total cost of ownership reduction. The operators have to provide more capacity and new services with higher quality of service requirements for less money per transmitted bit. The TCO reduction includes the capital expenditure for network equipment, the simplification and optimization of the network operation and the reduction of energy consumption. All these relevant points will be addressed and investigated in this sub-project. These investigations and the resulting developments of SASER-SIEGFRIED will have a strong strategic focus on the generation of intellectual properties and industrial policy in standardisation bodies which is important for the European companies.

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

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