Research Policy for Communication Systems and IT Security

Secure ICT systems are essential for a thriving economy and for almost every aspect of our heavily interconnected society.

Today, the Internet is one of the most important drivers of innovation in almost all significant areas of our society such as health, mobility, climate/energy and demographic change. At the same time, we are becoming more and more dependent on the flawless functioning of communication systems, their resilience, integrity and privacy as well as the availability of information.

With its research policy, the Federal Ministry of Education and Research seeks to

- consolidate and expand Germany's technological leadership position in ICT
- advance the implementation of research results in products and services
- develop new fields of application
- take on an active role in shaping the "digital world"
- support the informational self-determination of citizens.



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Safe and Secure European Routing (SASER)

SASER is a European project with 34 partners in Germany and 29 other project partners in France, Finland, Denmark and the United Kingdom. Leading European systems manufacturers, network operators and SMEs as well as universities and research institutions are participating in the project. SASER is being implemented within the framework of the EUREKA initiative, overseen by Celtic-Plus as a EUREKA ICT Cluster.

Project Coordinator:

Alcatel-Lucent Deutschland AG

Project Budget:

€80 million throughout Europe, €59 million of which in Germany

Duration of the Project: 08/2012 – 08/2015

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Federal Ministry of Education and Research

Free and Secure Travels on the Data Highway

Safe and Secure European Routing (SASER)

A Project for Communication Systems and IT Security



HIGH-TECH STRATEGY

The Objective: Safety on the European Data Highway

Routers are the intersections on the data highways of the Internet that forward traffic and ensure the flawless transport of data from its origin to its destination. In doing so, the routers have to satisfy extremely high demands, especially in terms of data security, which has to be guaranteed at all times. At the same time, the amount of traffic transmitted is growing exponentially. This poses major challenges to the routers: On the one hand, a traffic jam on the data highway needs to be avoided, i.e. overloading of the transmission channels needs to be prevented. On the other hand, the growing energy consumption that accompanies the increased traffic volume, needs to be curtailed.

Solutions to these challenges are being developed throughout the world. At the moment, manufacturers from non-European countries dominate the market. The Federal Ministry of Education and Research (BMBF) has launched the research project "Safe and Secure European Routing – SASER" in order to get the European network infrastructure in shape for the future. Partners from five European countries are jointly developing scientific and technological solutions for high-performance communication networks with high security standards and a sustainable cost and energy structure.

This will create the preconditions for making Europe less dependent on existing routing technologies and enabling it to regain a larger share of the world market for routing technologies.

The Challenge: Security Factor Data Conversion

Routers play a key role when it comes to security on the Internet because they receive and forward data. Today's IP routers are based on electronic technologies. They start by converting the optical signals into electronic ones, which they then distribute to the corresponding network trunks before converting them back into optical signals, which are transported to the recipient via the fibre optic network. Such conversion processes not only require a lot of energy but are also a gateway for attacks from the outside.

The Solution: Integrated Optical-Electronic Routers

The objective of the SASER project is to replace the energy intensive and unsafe IP routers with new, integrated optical-electronic nodes. For this purpose, the project partners are developing modular components that are based not just on electronic but first and foremost on optical technologies. The new components will be significantly more robust, energy-efficient and notably more secure than the IP routers currently used because they avoid complex analogue/digital conversions.



The Approach: For a Secure, Robust, Resilient Internet

Security

The solutions for optical transmission that the project seeks to develop are a key component in creating more security. Additionally, the project partners are developing a new optical encryption technology, which is intended to complement traditional cryptography. New methods for identifying anomalies – and thus attacks on the network – are also being developed to improve the security of IP based routers. In particular, measures are being taken to improve the automated identification of so-called backdoors, weaknesses in software code, which attackers use to gain unauthorized access to a system.

Robustness

The new network nodes and interfaces are being adapted to the requirements of the transmission channels in a flexible way. This makes the network more robust and efficient. The outage of individual devices can now be compensated and a temporary overload due to high amounts of data traffic prevented.

Resilience

The project involves the development of special technologies as well as new, open or standardised interfaces and technologies which will contribute to improving the resilience of the data pathways. This is also a key prerequisite for the ability to handle larger traffic streams in the future.