Project Achievements

Converged Infrastructure for Emerging Regions

CIER has developed a cost-efficient network to connect rural areas. This all-IP network provides communication and all other kinds of data transfer based on different wireless communication standards and uses wired and potentially satellite based connections to the Internet. CIER has designed a network architecture and defined the functional requirements for self-configuration, self-organization and self-management of heterogeneous network elements.

Main focus

The CIER project has developed the Future Internet building blocks required to connect rural areas in Europe and sparsely populated areas in developing countries to the global communication infrastructure. In remote parts of Europe and Africa, the lack of energy supply, of wired infrastructure, of trained personnel and the limitation in OPEX and CAPEX impose stringent requirements on the network building blocks that support the communication

infrastructure. Therefore, for this promising market, the CIER project has designed and implemented an energy-efficient, robust, reliable and affordable heterogeneous wireless network architecture to connect geographically very large areas in challenging environments (difficult topographies, harsh weather conditions, lack of supporting infrastructure, etc.).

Approach

The CIER project was organized in three phases, where

♦ In Phase 1, scenarios, business models, and requirements have been defined, and the overall system architecture was specified. The design is documented within WP2 and was continuously improved based on the input from WP3 and WP4.

♦ In Phase 2, a prototypical implementation and testing of the system components was carried out and incremental improvement from WP3 and WP4 in-

CIER

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Partners:

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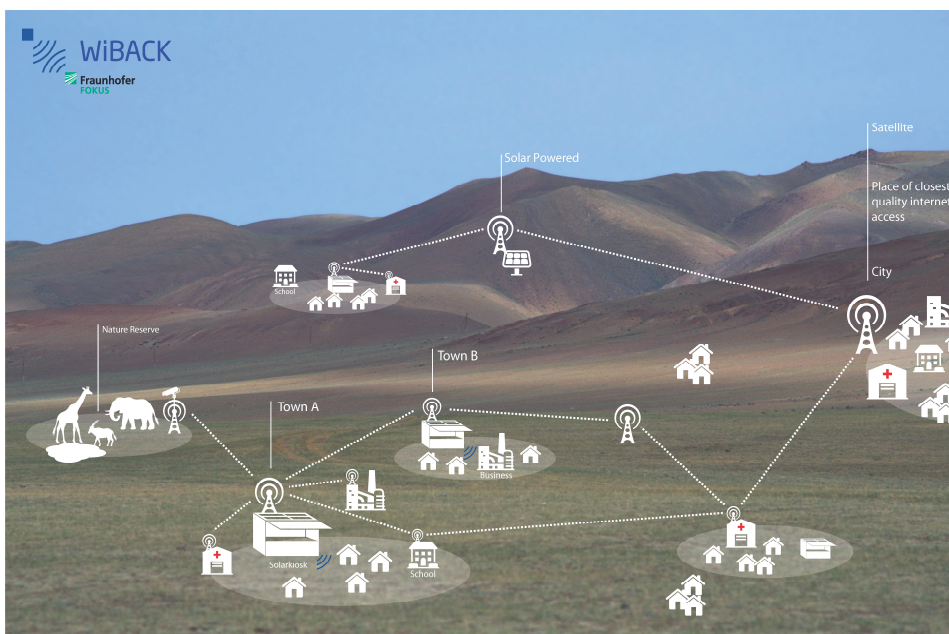Mathias Kretschmer and Christian Niephaus

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cluded and validated at component level before moving to system integration. In this phase, field trials in Germany and Finland have been conducted to evaluate the readiness for the next phase.

♦ In Phase 3, a more comprehensive field trial to provide cost-efficient broadband Internet services in a remote area (rural Tanzania) and a detailed performance evaluation was conducted. In addition, simulations and emulations have been used to evaluate the scalability of the system.

Achieved results

The overall CIER architecture has been fully evaluated and a number of pilot and commercial deployments building on the CIER concepts are operational world-wide. The CIER project was a major contributor to the Africomm Conference series which, together with the partners' other conference and journal publications, among them IEEE flagship conferences such as VTC and PIMRC, helped to create awareness of the CIER efforts and results. The final CIER architecture can be compared to recent efforts in the research community regarding wireless software-defined networks (SDNs) and may provide valuable contributions to the discussion on the future 5G architecture.

Impact

The CIER architecture allows for a cost-efficient broadband coverage of rural areas. It may be complemented with satellites to increase the available backbone capacity. The partners are planning to exploit the CIER results focusing on

a contract research organization, VTT aims at transferring the knowledge built in the CIER project to industrial partners for further development and commercialization of the results, so to actively enhance the competitiveness of industry and other business sectors.

their specific business and research focus. For example, Fraunhofer has integrated the relevant aspects into its WiBACK™ technology. Kaiserslautern University will extend the developed concepts (e.g. for network operation using autarkic energy supply) for further 5G research activities. As

About Celtic

Celtic is a European research and development programme, designed to strengthen Europe's competitiveness in telecommunications through short and medium term collaborative R&D projects. Celtic is currently the only European R&D programme fully dedicated to end-to-end telecommunication solutions.

Timeframe: 8 years, from 2004 to 2011

Clusterbudget: in the range of 1 billion euro, shared between governments and private participants

Participants: small, medium and large companies from telecommunications industry, universities, research institutes, and local authorities from all 35 Eureka countries.

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