Project Achievements

Cost optimized optical 100Gb/s transport technology for metro networks

100GET.es is a sub-project within the 100GET Cluster, aiming at the development of 100Gbps Carrier Ethernet transport technologies. The 100GET cluster constitutes of 5 Celtic sub-projects totalling a budget of about 65 M€. over 3 years. 100GET.es focuses on cost-optimized core and metro-edge control-enabled Optical Carrier Ethernet multi-layer network architectures and subsystems, with the ambition to foster the deployment of ultra-high broadband networks for 2012.

Main focus

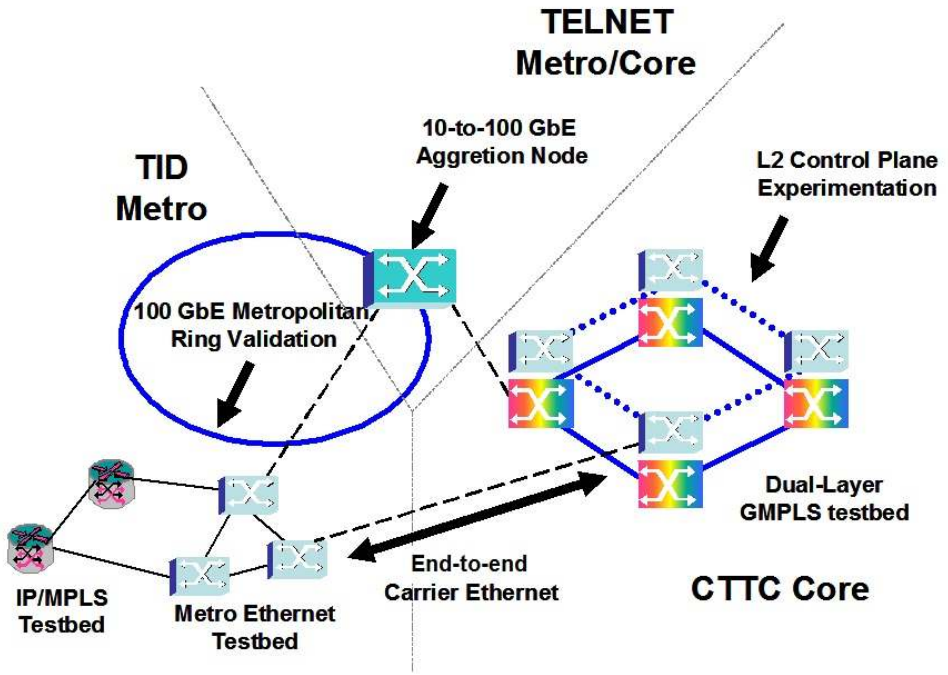
The new fibre accesses, the high definition IPTV deployments, the Future Internet trends and emerging services like video-conferencing, telemedicine, and security impose unprecedented requirements on current telecom networks.

In this context, the aim of the 100GET project is to achieve a qualitative step in the optical network transmission capacity (from 10/40 Gbps to 100 Gbps) to guarantee an efficient transport of significantly higher traffic loads than current ones, with QoS, reliability and automated management. This goal has been achieved by the development of end-to-end 100Gbps Carrier Ethernet Transport technologies, and their validation both from a theoretical and an experimental perspective.

For the European society, assuring the availability of low-cost and ultra-high capacity technologies promotes both the competence in the telecom markets as well as the deployment of infrastructures in traditionally unprofitable areas. In brief, it represents a qualitative step in the perception of the Internet access and digital services.

Approach

This project had the very ambitious objective of developing highly challenging emerging transport technologies, not of-



100GET-es

Project ID: CP4-001

Start Date: 1 September 2008

Closure date: 31 December 2010

Partners:

CTTC - Centre Tecnològic de Telecomunicacions de Catalunya, Spain

Telefónica I+D, Spain

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www.celtic-initiative.org/projects/100GET/default.asp

fered at the starting date by any manufacturer or service provider. Significant research effort, in coordination with all the members of the consortium, has made it possible. The approach adopted to validate 100G Carrier Ethernet technologies within 100GET has been threefold:

- From a theoretical perspective, the project has defined the network requirements and has performed 100G transmission simulations and techno-economic validations of 100G Ethernet transport architectures, including solutions for packet transport such as PBB_TE and MPLS-TP technologies.
- From the data plane perspective, the project has targeted the design of key optical components for a 100G coherent photodetector, the characterization of 100G optical transceivers, the implementation of a 40G transceiver analyzer, and finally, the experimental validation of a whole 100GbE transmission system.
- From a control plane perspective, the project has studied and proposed architectures and control protocol extensions to efficiently manage multi-layer (Ethernet over WDM) networks by means of a unified control plane.

Achieved results

The main results of the project have been:

- Specification and analysis: requirement specification of a 100 GbE Carrier Ethernet over Optical network architecture; theoretical validation (simulations and techno-economic assessment) of the deployment scenarios for carrier-grade 100 Gbps Ethernet technologies; exhaustive evaluation and comparison at both data and control plane levels of the two candidate technologies (PBB-TE and MPLS-TP) to deploy the future packet transport networks.
- Pre-industrial development: design of the individual passive subsystems required in the coherent receiver; development of a transceiver analyzer capable to transmit up to 40 Gbps; in-lab and on-field characterization of 100G transceivers; design of the control plane functions to control a 10x10 aggregation packet transport node; design of a unified multi-layer (Ethernet/WDM) control plane architecture along with planning and on-line routing algorithms to achieve an efficient use of the network resources (traffic aggregation).
- Experimentation: experimental validation of >1000Km long reach 100 Gbps transmission in a world-first field trial.

Finally, the protection of the intellectual property of the results is expected, obtaining, if necessary, the corresponding patent licenses.

Impact

The development of new optical technologies to cope with an ever growing demand for broadband services, is a key requirement for the economic viability of current transport networks and the development and competitiveness of system vendors

The strong presence of the 100GET.es project in conferences as ECOC, ONDM, ACMA, Celtic Event, OPTOEL, etc. has been an excellent opportunity to show the project results. Moreover, some of the field trials have been reported in national and international press. Finally, control plane evaluation results have been transmitted to IETF standards body and are the basis of an active standard draft.

Moreover, 100GET.es project has facilitated the sharing of knowledge among participants around Europe, leading to the accomplishment of a common global vision, and allowing guaranteeing the European industry position in the leadership of 100G Carrier Ethernet technologies.

For the European society, assuring the availability of low-cost ultra-high capacity and energy-optimized technologies promotes the development of the Information Society in a sustainable way. In brief, it represents a qualitative step forward in the perception of the Internet access and digital services.

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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