CELTIC
Telecommunication Solutions

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 metro-edge solutions to extend the end-to-end control-enabled optical Carrier Ethernet to the metro-edge, with the ambition to foster the deployment of ultra-high broadband networks in a 2012 horizon.

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.
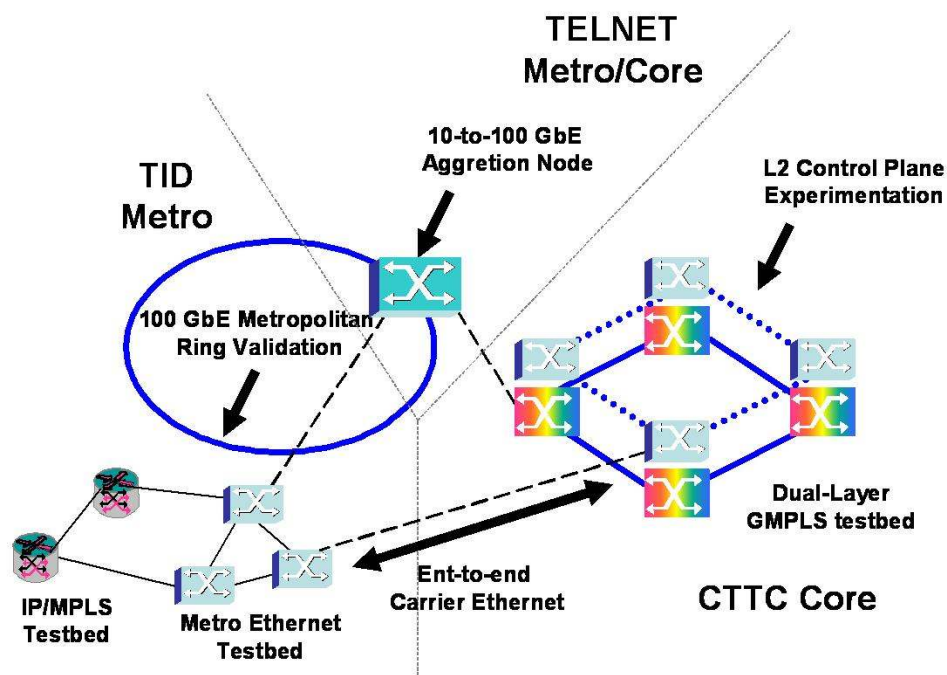
In this context, the aim of the 100GET project is to achieve a qualitative step in the optical network transmission capacity (from 10/40 Gbps to 100 Gbps) to guarantee an efficient transport of significantly higher traffic loads than current ones, with QoS, reliability and automated management. This goal will be 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 has the very ambitious objective of developing highly challenging emerging transport technologies. As currently there is no manufacturer or services

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

provider who offers this kind of technology, a great investigation effort will be necessary, coordinated and developed by all the members of the consortium.

For a full validation of the proposed technologies, the project will cover a wide range of activities, from network requirements and business scenarios to system development and experimental validation. More concretely, the approach adopted to validate 100G Carrier Ethernet technologies within 100GET is threefold:

♦ From a theoretical perspective, the project will define the network requirements and will perform 100G transmission simulation and techno-economic validation of 100G Ethernet transport architectures, including solutions for packet transport.

♦ From the data plane perspective, the project targets the design of key optical components for a 100G coherent photodetector, the characterization of 100G optical transceivers, the challenging development of an electronically fed 10-100GbE aggregation node, and finally, the experimental validation of a whole 100GbE transmission system.

♦ From a control plane perspective, the project will investigate the development of multi-layer and multi-domain control plane solutions, the development of a control-plane entity for efficiently controlling an access/ aggregation node, and will aim at the experimental validation of the

control plane functionalities to manage an integrated Carrier Ethernet over an optical transport infrastructure.

The different activities will be finally validated in an experimental test-bed, composed of the IP/MPLS and Carrier Ethernet facilities, an optical fiber metropolitan ring in Madrid, a dual-layer GMPLS test-bed, and a 10-100 GbE aggregation node prototype.

Main results

The main goals of this project essentially include technological validation. The expected results of the project are:

♦ Specification and analysis: requirement specification of a 100 GbE carrier-grade architecture; theoretical validation (architecture, data plane, control plane) of the deployment scenarios for carrier-grade 100 Gbps Ethernet technologies;

♦ Pre-industrial development: development of integrated photonic components for the photo receiver; development of a node prototype equipped with a control plane instance for aggregating ten x10GbE interfaces into a 100GbE output interface; characterization of the optical and optoelectronic components of the node; development of the multi-layer (Ethernet/WDM) control plane functions along with algorithms for efficient and dynamic traffic aggregation.

♦ Experimentation: experimental validation of a 100 Gbps transmission in a metropolitan trial run; validation of the benefits of the aggregation node, and its integration in an end-to-end network pilot; validation of an end-to-end multi-layer control plane with multi-domain interfaces.

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, whose need is justified by the growth of demand for broadband services, is a key requirement for the growth and positioning of the operators, the development and competitiveness of system vendors, the research enforcement, the development in innovation centres and the integration of citizens in the new information society.

The 100GET.es project facilitates the sharing of knowledge among the participants, leading to the accomplishment of a common global vision, and allowing to guarantee a better integration of the European optical network market, as well as guaranteeing that the European industry and research community do not miss the emerging business opportunity, and strengthens 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 in the perception of the Internet access and digital services.

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