P09: Centre Tecnològic de Telecomunicacions de Catalunya - CTTC (Spain)

Description of expertise & activities

CTTC (http://www.cttc.es) is a supra-university research center devoted to the development of long-term R&D projects on communications systems. **Research** in optical networking technologies is performed at CTTC within its Optical Networking Area, whose goal is the evolution of telecommunication systems towards intelligent, dynamically reconfigurable all-optical networks. Currently, research work is based on enhancing the intelligence, efficiency, robustness and cost-effectiveness of IP over wavelength multiplexing (WDM) networks in a multi-layer and multi-domain environment. This research goal is approached in two generic lines within the scope of network control and management (NC&M), namely, Advanced GMPLS-based distributed schemes and Algorithms and Novel strategies for fault and performance Management. The first research line focuses on the intelligent mechanisms (CBR-algorithms and protocols/schemes) through using a GMPLS-based control in order to enable dynamic and real-time provisioning of QoS-enabled services, automatic topology and resource discovery, traffic engineering, and efficient and dynamic recovery (protection and restoration) schemes in multi-layer multi-domain networks. The second research line focuses on the integration of accommodated management in next-generation optical networks with a focus on the collection and use of information about impairments and network performance to improve the accuracy and reach of control- and management-related decisions in multi-layer, all-optical networks, and hence to improve service quality as the final goal. The Area's most outstanding background of participation in R&D projects is: participation in international projects such as IST (IP NOBEL, IP NOBEL2 and NoE e-Photon/One+ --as Collaborating Institution--), EUREKA (ITEA TBONES and CELTIC PROMISE), and in Spanish projects MCYT (EMPIRICO), MEC (PROYECTO I+D RESPLANDOR led by CTTC, Red Temática R-MPLS) and CTTC Strategic (NETCAT). **Demonstration** is performed within the context of the ADRENALINE (All-optical Dynamic REliable Network hAndLINg IP/Ethernet Gigabit traffic with QoS) testbed (www.cttc.es/adrenaline), a GMPLS-based Intelligent Optical Network developed at CTTC labs.

Tasks within BONE

WP11	Design of automatic and dynamic schemes for provisioning of traffic-engineered and QoS enabled end-to-end services in multi-domain network scenarios as well as distributed recovery schemes for delivering robust end-to-end services.
WP22	Innovative applications of GMPLS applied at the edge-node devices considering Ethernet over optical integration (GMPLS controlled wavelength switching within the optical domain).
WP26	New control schemes for the integration of Ethernet-based access and aggregation networks and the optical domain, proposing unified and integrated control of both switching layers, considering hybrid switches with L2SC and LSC switching capabilities

Key personnel

Raül Muñoz is Research Associate and Director of the CTTC's Optical Networking Area. His research interest areas include GMPLS, distributed control schemes, RWA, protection and restoration, all-optical transport network. Since 2000, he has been coordinating and participating actively in 9 public-funded Spanish and EU R&D projects in optical networking. He is leading the Spanish RESPLANDOR project and he published over 34 journal or conference papers in this field

Ramon Casellas is Research Associate at CTTC Optical Networking Area since 2006. From 2002 to 2005 he was associate professor at Ecole Nationale Supérieure des Télécommunications, (ENST Paris), and has been involved in several national and international research projects. His current research interests are related to topics on traffic engineering, performance evaluation, GMPLS architecture and control schemes, shared path protection and network planning and dimensioning.

Ricardo Martínez is Research Assistant of the CTTC´s Optical Networking Area (ONA) and coordinator of the ONA Lab. His research interest areas include GMPLS architecture, RWA algorithms, survivability issues, and photonic transport networks. He has actively participated in several National and EU-funded R&D projects in optical networking. He published over 30 journal and conference papers in this field.

Carolina Pinart is a Collaborating Researcher of CTTC's Optical Networking Area. Her research interests include network management, optical performance monitoring, optical signal quality and fault management in all-optical networks. Since 2000, she has been participating in 13 public-funded Spanish and EU R&D projects in wireless and optical networking. She has published over 35 journal and conference papers, and was an invited researcher at the NICT (Tokyo) through a post-doc fellowship.