BONE Major Achievements

WP12 : VCE on “Services and Applications”

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WP Objectives

The Virtual Center of Excellence on Services and Applications has the following specific objectives:

- To integrate the research efforts on applications and services in Europe with special emphasis on those based on optical networks.
- To collect inputs and research outcomes for preparing guidelines of the most appropriate approaches for the application-to-network interaction to be offered to European providers and vendors
- To investigated service platform architectures that apply to the various network segments handled by telecom operators
- To define roadmaps for the evolution of the telecommunication business in terms of services based on network and non network resources.

Status at start of the BONE-project

Application-to-network mapping is the key-point needed to fill this semantic-gap and dynamically provision QoS-enabled network services to qualified user applications. In networks that involve different network technologies, the service provisioning of an user request needs a concatenation of different mapping to realize a real end-to-end network configuration involving network and non-network resources.

Another important role in service delivery is played by service interconnection resilience. Indeed, interconnection between services and both other services and client is of paramount importance for the successful service delivery. So far, schemes for service fault tolerance and network fault tolerance have evolved independently. However the integration of such schemes have the potential of increasing the overall reliability while lowering the required costs.

Major progress during BONE-project

A new architecture of a service-aware optical network has been proposed, suitable for cloud computing applications. The networking paradigm introduces service awareness in the core, by creating self-organized islands of service transparency. To allow for service-aware networking, a complete suite of algorithms, strategies, and mechanisms for implementing service abstraction and resource virtualization were proposed and investigated. Mechanisms for the co-selection and co-reservation of the resources in the service plane were shown to improve the performance of service provisioning for future Internet applications. Also, the impact of the service plane as an integrated entity vs. trusted or separate entity was evaluated. Moreover, the configuration of the service layer and network virtual platforms to support cloud computing have been proposed and discussed.

The experimental activity demonstrated the feasibility of the service plane and service-oriented optical networks. During the experimental assessment, the service set-up latency experienced in a service-plane testbed was evaluated and was shown to meet ITU-T recommendations. PCE-based control plane enabled with functionality for the setup of grid services has been tested on an optical network with commercial equipment and validated the simulative results.

In addition, research outcomes were achieved in the field of strategy and approaches to improve and guarantee the service availability. In particular, the relocation of services was proposed as a way to guarantee resilience and capable of reducing to reduce the capacity requirements of the network. Evaluation of the reliability of an integrated wireless and wired network was carried out and showed a trade-off between reliability and number of handovers experienced by the service.

Added value of the BONE NoE

Overall, 16 partners were involved in this virtual center of excellence and seven joint activities have been active in the WP. Along the WP development, the collaboration among partners increased and among others, allowed to set-up three joint testbeds for experimental evaluation of service-oriented platforms for optical networks, based on GMPLS or OBS. Dissemination of the joint activities in international conferences and journals and in

the Open Grid Forum standardization body has been actively pursued. The overall integration in the WP can be assessed by the observing that nearly half of the WP publications are joint.

In addition the development of a national and new European project have been eased by the presence of the BONE project, namely the European FP7 project “Scalable, Tunable and Resilient Optical Networks Guaranteeing Extremely-high Speed Transport” and the national FIRB project “Software and Communication Platforms for High-Performance Collaborative Grid”. Finally, a Memorandum of Understanding for specific collaborations between SSSUP and KTH.