

**PROJECT / Cross-Layer
Optimization in Multiple Mesh
Ubiquitous Networks**

UbiquiMesh

Main Objective:

The objectives are to maximise resource transmission efficiency whilst guaranteeing the quality (of experience) and minimising the effort for each entity/operator. In line with these objectives, optimization mechanism account for:

- Information from the different protocol stack layers to optimize the subscriber access performance, and the creation of cross-layer design interactions whilst optimizing the quality of experience (QoE) metrics;
- Interaction among the different network entities to make the service available to the subscribers in an optimized way, taking the possibility of having different companies operating the backhaul and the access networks.

The focus of the research activities will be the following:

- To identify, monitor and optimize QoE metrics for voice and video services in these networks by considering the support of an hierarchy of mesh networks for the identified scenarios;
 - To define cross-layer mechanisms to optimize the impact of the developed QoE metrics into the concatenated mesh network performance. Our research will explore mechanisms for efficient use of spectrum, for the shared medium access and routing onto the concatenated networks, transport issues, as well as the usefulness of context awareness, e.g. positioning, the distribution of the velocities and active services;
 - To apply game theory concepts to optimize the cooperation among the different agents: subscriber terminal access network nodes (gateway to the operator) and backbone network routers;
 - To use pricing models to analyse the benefit associated with agent as well as the interactions among different network operators through the use of the optimization methodologies previously proposed.
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