

SOURCE:     <sup>(1)</sup> Instituto Superior Técnico (IST) / INESC-ID,  
                  University of Lisbon, Portugal

<sup>(2)</sup> Polytechnic Institute of Setúbal, Portugal

## **A Model for Virtual Radio Resource Management in C-RAN**

Abstract - This paper proposes a model of Virtual Radio Resource Management (VRRM) to provide Quality of Service (QoS) guarantees for different classes of services in a heterogeneous Cloud-based Radio Access Network (C-RAN). In this model, a single Virtual Network Operator (VNO) asks for wireless capacity from a set of physical network providers to serve its subscribers, and not having to deal with the physical infrastructure. The algorithm estimates the available capacity of the network based on the accessible radio resources from different Radio Access Technologies (RATs), and then allocates to each service of VNO, a portion of the available data rate based on the VNO's Service Level Agreements (SLAs). This process is done by solving a constrained nonlinear optimisation problem, which tries to balance and prioritise the allocated data rate of different services according to their specific QoS needs. The performance of the proposed algorithm is evaluated through implementing practical heterogeneous network scenarios. Results show that the algorithm is capable of satisfying the predefined SLAs, while maximising the utilisation of resources.

Behnam Rouzbehani<sup>(1)</sup>, Luis M. Correia<sup>(1)</sup>, Luísa Caeiro<sup>(2)</sup>  
Instituto Superior Técnico - University of Lisbon  
INESC-ID  
Rua Alves Redol, 9, 1E  
1000-029 Lisboa  
Portugal  
Phone: + 351-934 483 938  
Fax: + 351-213 100 472  
Email: {behnam.rouzbehani, luis.m.correia}@tecnico.ulisboa.pt