

MURANES: Framework for Multi-Resource Allocation in Network Slicing

Francesca Fossati¹, Stefano Moretti², Patrice Perny¹, Stefano Secci^{1,3}

5G networks formalize the ‘network slice’, i.e. a virtualized network partition on top of a physical network that makes use of a set of heterogeneous resources, as a resource allocation unit. If in legacy networks, resources are allocated independently of each other, in 5G environments, a network slice is meant to directly serve end-to-end services, or verticals [1]. Behind a network slice demand, a tenant expresses the need to access a precise service type, under a fully qualified set of computing and network requirements. The resource allocation decision encompasses, therefore, a combination of different resources. In this talk, we address the problem of fairly sharing multiple resources between slices, in the critical situation in which the network does not have enough resources to fully satisfy slice demands. We model the problem as a multi-resource allocation problem, proposing a versatile optimization framework based on the Ordered Weighted Average (OWA) operator [2]. Adapting the OWA utility function, our framework can generalize classical single-resource allocation methods (for example the proportional allocation [3]), existing multi-resource allocation solutions at the state of the art (for example the DRF [4]), and implement novel multi-resource allocation solutions. We present the results obtained by extensive simulations with realistic slice demand request patterns showing the difference between the methods in terms of fairness and system efficiency.

References

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¹Sorbonne Université, CNRS LIP6, Paris, France,
Email: {firstname.lastname}@sorbonne-universite.fr

²Université Paris Dauphine, Paris, France, Email: stefano.moretti@lamsade.dauphine.fr.

³CNAM Paris, France, Email: secci@cnam.fr.

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