Ph.D. in Information Technology:

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LIETO ALESSANDRO – XXXIII CYCLE

PhD thesis title

Mechanisms and algorithms for dynamic resource sharing in network slicing

Advisor: Prof. Antonio Capone

ABSTRACT

Network slicing will radically transform the network management paradigm of traditional network technologies by dynamically and virtually slicing the network in multiple independent end-to-end logical networks, namely slices. In this thesis, it is elaborated the concept of dynamic slicing, which allows dynamic configuration and deployment of slices, by enabling flexibility and automation in network management and orchestration. According to such dynamic slicing vision, slice tenants can automatically reconfigure their slice settings, by tracking the level of performance of their slices and the fluctuations of the price offered by the network slicing service provider. It is defined a framework that enables dynamic sharing of radio resources by proper scheduling implementations and a marketplace where tenants can trade network resources, according to techno-economic evaluation. An automated renegotiation mechanism, that models the interactions of slice tenants in the marketplace, is proposed and the convergence properties of its algorithmic implementation described, which guarantees the converge to a Nash Equilibrium for any number of tenants engaged in the market.

Numerical results show the benefits of the proposal and validate this framework on realistic scenarios where tenants can adapt their requirements according to the fluctuations of traffic of their slices.

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