

# A new 5G network Slicing Optimization Model with Cybersecurity levels

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**Abstract.** In this talk, we present a three-level 5G Network Slicing that consists of the resources layer, the network slices layers, and the services layer. The multilevel network that we have determined is able to represent all the fundamental elements of different structures of network slice architectures. We propose a Constrained Optimization Model that allows us to establish the optimal flows (between the network layers) and the optimal cybersecurity levels in order to maximize the profits of the providers. The mathematical optimization model formulated also allows to manage the presence of exclusive customers (intended as users or devices that request services) of some providers, considers the limited resources and slices (intended as limited quantities and maximum capacity) and ensures that the service is provided if and only if all necessary resources are available and usable. There is also a non-linear budget constraint on investment costs in the model. Finally, for the resolution of this model, we have proposed a new heuristic approach in which we have appropriately modified all the fundamental points of the genetic algorithm, namely: generation of the initial population, selection, crossover, and mutation.

**Keywords:** 5G Network Slicing; Constrained Optimization; Cybersecurity; Modified Genetic Algorithm

## References

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