

Resource Capacity Analysis in Network Slicing with Ensured End-to-End Performance Bound

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ABSTRACT

It is envisioned that many different types of applications, each requesting a different set of network functions with different quality of service requirements, will run on 5G networks. To accommodate such requests, network slicing, which dynamically creates virtual networks for different types of applications, is proposed in the literature and IETF. A critical issue for the success of network slicing is to determine the amount of resources for a slice to ensure the required quality of service, i.e., the relationship among traffic demand, resource, and delay. This paper aims to tackle this problem. We first study the delay bound for a given traffic distribution and amount of resources using Stochastic Network Calculus (SNC). Then we propose a solution to derive the amount of resources that should be allocated to meet a given delay bound for a given traffic distribution. Extensive simulations show that given the derived amount of resources, the experienced end-to-end delay is less than the given delay bound. However, if only 90% of the derived amount of resources is given, the experienced end-to-end delay is much higher than the allowed delay bound. This demonstrates that the derived amount of resources is close to the minimum amount of resources for ensuring quality of service. The work provides a useful tool for network slice tenants to decide the amount of resources to request from physical network providers.

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All are welcome!



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