

AI-based 5G Revenue Maximization

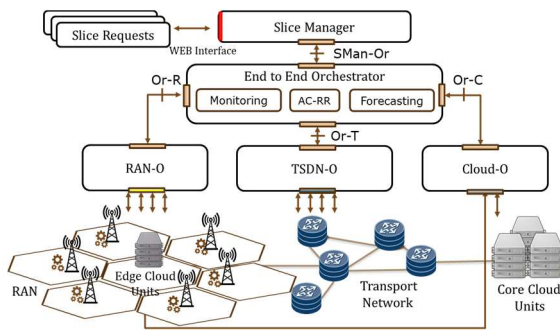
Overbooking Network Slices

We demonstrate an **End-to-end Network Slicing Orchestration** solution that applies the concept of **Overbooking** to Network Slicing by exploiting Artificial Intelligence (AI) tools.

Design Principles

■ Hierarchical Orchestration

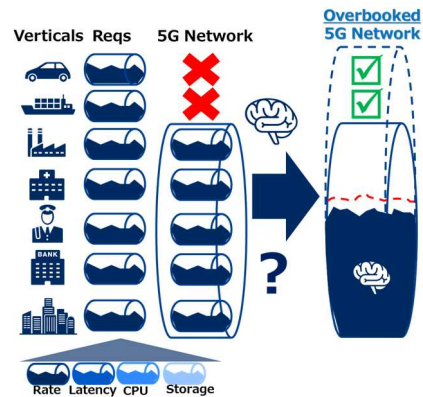
The E2E Network Slice Orchestrator is **placed on top of multiple domain orchestrators** that manage different network domains, such as radio, transport and core.



The domain orchestrators (RAN-O, TSDN-O, Cloud-O) dynamically deal with resource assignments as well as implement monitoring activities on the respective resources utilization.

■ Overbooking Network Slices

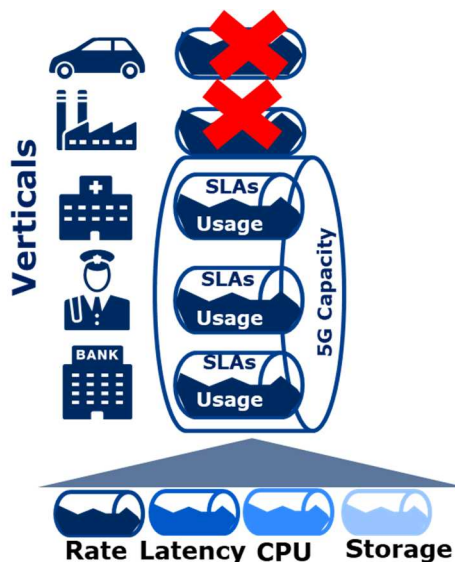
We explore the concept of **slice overbooking**, dynamically adapting resources to predicted utilization and leveraging on elastic vs inelastic resources needs.



Our AI-based approach maximizes revenue and minimizes resource deficit.

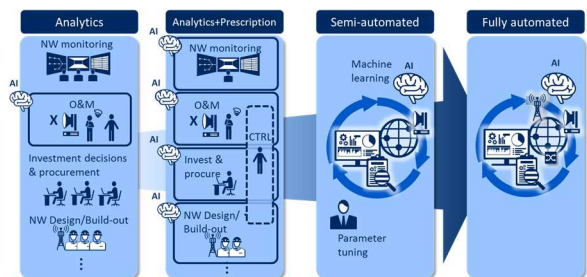
■ The Business of Network Slicing

Network slicing can become cost-inefficient if the service-level agreements are guaranteed simply by *overprovisioning*.

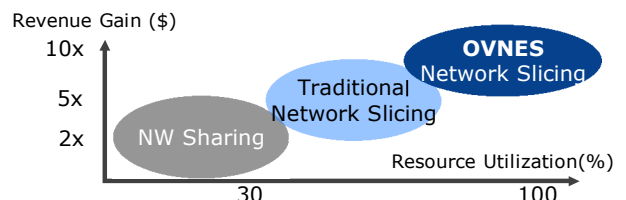


■ AI-based 5G Resources Management

From Monitoring analytics to full Automation



■ Value

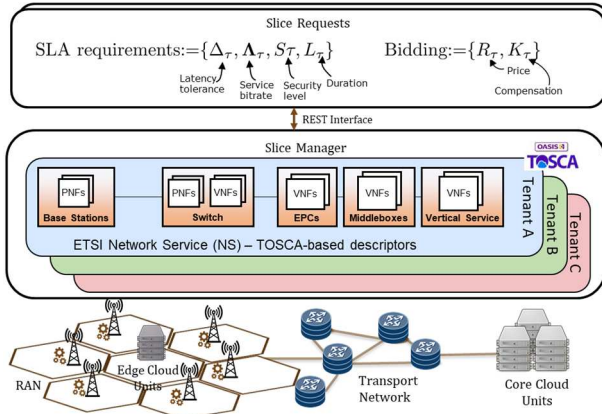


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OVNES: Under the hood

■ Slice Manager

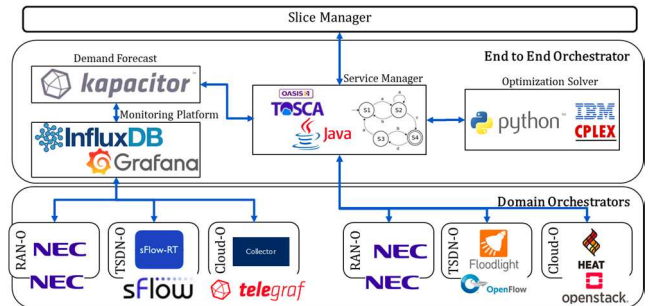
The Slice Manager receives SLA requirements and bidding data from each vertical.



Then, it automatically builds a Network Service Descriptor (NSD) that includes radio, transport, EPC, middleboxes (e.g. security) and the vertical service itself — all functional components that construct a fully-functional end-to-end 5G slice

■ End-to-End Orchestration

We design a hierarchical orchestration system with domain orchestrators producing monitoring data and enforcing per-domain decisions.



The E2E Orchestrator aggregates data and coordinates AI algorithms for demand prediction, risk assessment, network slice admission control and network slice resource allocation.

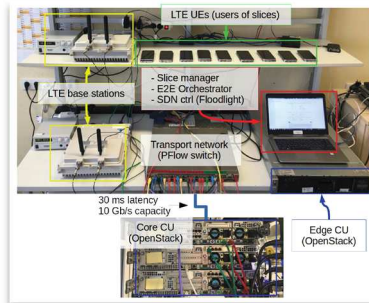
Our system leverages on open-source software components when available.

Main Results

■ Scenario

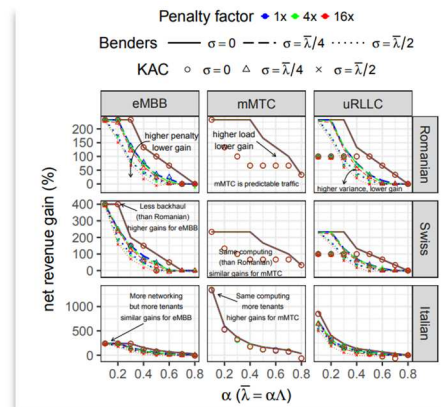
prototype over Real topologies

Evaluation in Large-scale scenarios



(a) Romanian topology (N1). (b) Swiss topology (N2). (c) Italian topology (N3).

■ Results



Overbooking may bring up to **200%** revenue gains when load is low and predictable