Cooperative Cost Sharing for Multi-Tenant Edge Computing Coinvestment

A Marketplace for Edge Computing in 6G Networks

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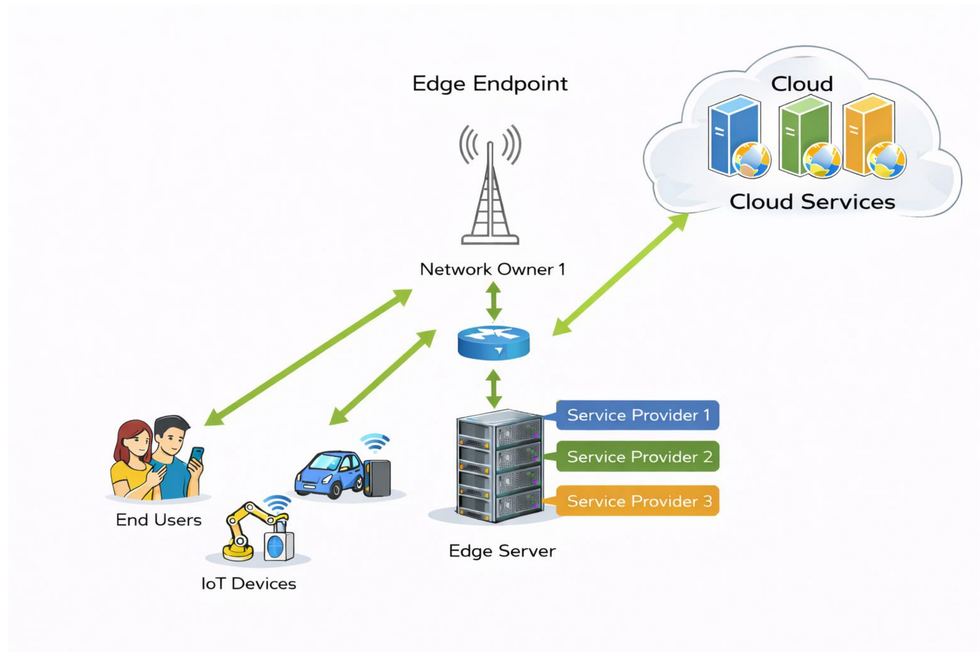
PhD goals and general vision

A marketplace for 6G edge computing

1. Design a marketplace where Network Operators (NOs) buy and sell edge computing resources to meet service objectives under time-varying demand.
2. Ensure Quality of Service (QoS) by enabling NOs to access the computing resources needed when local capacity is insufficient, while keeping latency-sensitive traffic close to end users.
3. Improving infrastructure utilization and economic viability through resource pooling and sharing.
4. Reduce environmental footprint by prioritizing nodes powered by renewable energy and by incorporating energy-related conditions into resource allocation decisions.
5. Formulate allocation and pricing mechanisms that are transparent and operationally implementable, relying on measurable quantities for auditing and settlement.
6. Use optimization methods and game theory to derive efficient allocations and fair costs and utilities sharing that support stable participation among NOs.

A first contribution

Target-based contracts and cooperative cost sharing for multi-tenant edge co-investment



1. Address the challenge that deploying and operating edge resources is costly, and a single Network Operator may not finance it alone.
2. Propose a contracting framework where multiple Service Providers participate in the edge infrastructure investment in exchange for allocation of computing resources.
3. Use public and measurable inputs (observed traffic loads, allocated resources, published cost terms) so the contract is transparent, auditable, and implementable in practice.
4. Avoid relying on private valuations of edge service revenues since it can undermine the practical implementation.
5. Define Service Provider allocation targets, and design payment rules that incentivize allocations close to these targets.
6. Formulate the Network Owner's capacity provisioning and per-slot allocation as an optimization problem driven by the contract terms and operational measurements.
7. Compare the resulting outcomes with typical cooperative formulations that rely on private information.

PhD Students' Day

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