

QoS-Aware Fog Node Placement for Intensive IoT Applications in SDN-Fog Scenarios (Summary)*

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Summary of the Contribution

The advent of the Internet of Things (IoT) paradigm to intensive domains, such as industry, is a key enabler for the automation of critical, real-world processes. The strict Quality of Service (QoS) requirements of these domains make low-latency computing paradigms, such as fog computing, very attractive for meeting these requirements. Moreover, the requirements of scalability and flexibility in the underlying network communications motivate the use of Software-Defined Networking (SDN) in the infrastructure. To enable these fog-SDN environments, fog nodes that have both computing and SDN capabilities can be deployed, thus easing the deployment of fog in SDN networks. However, the exact placement of these fog nodes is key to the latency of the hosts that make use of them, and thus, must be carefully assessed to meet the stringent QoS requirements of critical, time-strict IoT applications. This paper focuses on this fog node placement problem by formalizing it and solving it through both optimal and approximated methods, including comparisons with state-of-the-art benchmarks. In particular, we analyze the performance of each of these methods in terms of latency and execution time in both SDN Internet topologies and Industrial IoT infrastructures. Our proposed heuristic provides placements with near-optimal latencies, with smaller optimality gaps than the benchmark, and computes them in tractable times.

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