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MIFaaS: a Mobile-IoT-Federation-as-a-Service Model for Dynamic Cooperation of IoT Cloud Providers

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Abstract

In the Internet of Things (IoT) arena, a constant evolution is observed towards the deployment of integrated environments, wherein heterogeneous devices pool their capacities to match wide-ranging user requirements. Solutions for efficient and synergistic cooperation among objects are, therefore, required. This paper suggests a novel paradigm to support dynamic cooperation among private/public local clouds of IoT devices. Differently from *device-oriented* approaches typical of Mobile Cloud Computing, the proposed paradigm envisages an *IoT Cloud Provider (ICP) -oriented* cooperation, which allows all devices belonging to the same private/public owner to participate in the federation process. Expected result from dynamic federations among ICPs is a remarkable increase in the amount of service requests being satisfied. Different from the Fog Computing vision, the network edge provides only management support and supervision to the proposed Mobile-IoT-Federation-as-a-Service (MIFaaS), thus reducing the deployment cost of peripheral micro data centers. The paper proposes a coalition formation game to account for the interest of rational cooperative ICPs in their own payoff. A proof-of-concept performance evaluation confirms that obtained coalition structures not only guarantee the satisfaction of the players' requirements according to their utility function, but also these introduce significant benefits for the cooperating ICPs in terms of number of tasks being successfully assigned.

Keywords: IoT, Mobile Cloud Federation, Mobile Edge Computing, Fog Computing, Coalition Formation, Game Theory

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