Resource Orchestration Based on Two-Sides Scheduling in Computing Network Control Sytems

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Abstract : Computing networks as a new network architecture has shown great promise in boosting the utilization of different resources, such as computing, caching, and communications. To maximise the efficiency of resource orchestration in computing network control systems (CNCSs), this work proposes a dynamic orchestration strategy of a different resource based on task requirements from computing power requestors (CPRs). Specifically, computing power providers (CPPs) in CNCSs could share information with each other through communication channels on the basis of blockchain technology, especially their current idle resources. This dynamic process is modeled as a cooperative game in which CPPs have the same target of maximising long-term rewards by improving the resource utilization ratio. Meanwhile, the task requirements from CPRs, including size, deadline, and calculation, are simultaneously considered in this paper. According to task requirements, the proposed orchestration strategy could schedule the best-fitting resource in CNCSs, achieving the maximum long-term rewards of CPPs and the best quality of experience (QoE) of CRRs at the same time. Based on the EdgeCloudSim simulation platform, the efficiency of the proposed strategy is achieved from both sides of CPRs and CPPs. Besides, experimental results show that the proposed strategy outperforms the other comparisons in all cases.

Keywords : computing network control systems, resource orchestration, dynamic scheduling, blockchain, cooperative game

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