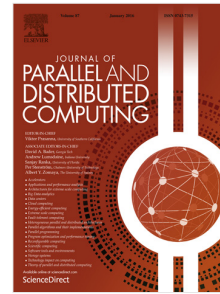


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Edge-of-Things Computing Framework for Cost-effective Provisioning of Healthcare Data

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Abstract

Edge-of-Things (EoT)-based healthcare services are forthcoming patient-care amenities related to autonomic and personalized healthcare, where an EoT broker usually works as a middleman between the Healthcare Service Consumers (HSC) and Computing Service Providers (CSP). The computing service providers are the edge computing service providers (ECSP) and cloud computing service provider (CCSP). Sensor observations from a patient's body area networks (BAN) and patient's medical and genetic historical data are very sensitive and have a high degree of interdependency. It follows that EoT based patient monitoring systems or applications are tightly coupled and require obstinate synchronization. Therefore, this paper proposes a portfolio optimization solution for the selection of virtual machines (VMs) of edge and/or cloud computing service providers. The dynamic pricing for an EoT computation service is considered by the EoT broker for optimal VM provisioning in an EoT environment. The proposed portfolio optimization solution is compared with the traditional certainty equivalent approach. As the portfolio optimization is a centralized solution approach, this paper also proposes an alternating direction method of multipliers (ADMM) based distributed provisioning method for the healthcare data in the EoT computing environment. A comparative study shows the cost-effective provisioning for the healthcare data through portfolio optimization and ADMM methods over the traditional certainty equivalent and greedy approach respectively.

Keywords: Edge-of-things, body area networks, virtual machine, portfolio

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