

Documents

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ML-based Admission Control of Cloud Services: Centralized versus Distributed Approaches

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Abstract

Effective management of Cloud Data Center (CDC) and the provisioning of services with desired QoS guarantees is a challenge which needs to be addressed through autonomous mechanisms which are intelligent, lightweight and scalable. Recent focus on applying Machine Learning approaches to model the CDC and service behavioral patterns have proved to be quite effective in fulfilling the objectives of autonomous management. To this end, this paper advances on the idea of implementing a distributed management solution which harnesses the predictive capability of Bayesian Networks (BN). Multiple CDCs which are usually geographically distributed are modeled through a Multiple Entity Bayesian Network (MEBN) formulation. The framework termed as BNDSAC (Bayesian Network based Distributed Services Admission Control) is proposed and evaluated to study the services admission control of cloud service requests from the cloud consumers. A thorough evaluation of BNDSAC is presented in terms of its prediction accuracy, algorithmic complexity and decision-making speed. In an online setup, performance of BNDSAC is evaluated and compared with a centralized scenario, to demonstrate its superior performance for Services Blocking Probability and QoS provisioning. Simulation results based on Riverbed Modeler and Hugin Researcher show the feasibility and applicability of BNDSAC solution for real-Time operation and management of real world CDCs. © 2018 IEEE.

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