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# A Game Theory-based Dynamic Resource Allocation Strategy in Geo-distributed Datacenter Clouds

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## Abstract

Geo-distributed Datacenter Cloud is an effective solution to store, process and transfer the big data produced by Internet-of-Things (IoT). A key challenge in this distributed system is how to allocate the bandwidth resources among these geo-distributed datacenters of this cloud efficiently. This paper aims to address this challenge by optimizing the transfer bandwidth resources among different geo-distributed datacenters. To this end, we firstly analyze the interaction between the traffic of physical networks and the data flow of Geo-distributed Datacenter Clouds, and then establish a game theory-based model for cloud resource allocation. Based on this model, a dynamic resource allocation strategy and its corresponding algorithm that are adaptable to the Internet conditions are proposed. Since the background traffic, capacity limit of physical networks as well as the flows and resource demands of geo-distributed datacenters are taken into account, this new strategy can achieve the load balance of the physical networks and content transferring among different geo-distributed datacenters effectively. The real-world trace data is adopted to validate the effectiveness and efficiency of the proposed resource allocation strategy. Compared with existing strategies, the evaluation results demonstrate that our proposed strategy can balance the workloads of physical networks, reduce the response delay of cloud applications, and possess an excellent adaptability. © 2011 Elsevier Science. All rights reserved

*Keywords:* Geo-distributed Datacenters, Cloud Computing, Resource Allocation, Game Theory;

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