Guest Editorial Preface

Special Issue on Systems and Applications of Cloud Computing and Big Data Services

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BIG DATA SYSTEM

Under the big data era, how to store and manage the big data is a big problem for those application systems. The emergence of NoSQL Database provides a good solution for those applications' data storage and management. The paper by Zhikun Chen, Shuqiang Yang, Yunfei Shang, Yong Liu, Feng Wang, Lu Wang and Jingjing Fu entitled "Fragment Re-allocation Strategy Based on Hypergraph for NoSQL Database Systems" proposes a fragment re-allocation strategy based on hypergraph. This strategy uses a weighted hypergraph to represent the fragments' access pattern of operations. A hypergraph partitioning algorithm is used to cluster fragments in the strategy. This strategy can improve system's performance according to reducing the communication cost while guaranteeing the parallel degree of operations. Experimental results confirm that the strategy will effectively contribute in solving fragment re-allocation problem in specific application environment of NoSQL database system, and it can improve system's performance.

CLOUD SERVICES MANAGEMENT

How to manage cloud services efficiently is difficult for large scale of services with frequently changing Quality of Service (QoS) in cloud computing environment. The paper by He Qian, Wang Yong, Li Jia and Cai Mengfei entitled "Publish/Subscribe and JXTA based Cloud Service Management with QoS" proposes a multiple-dimension publish/subscribe (pub/sub) and JXTA based cloud service management mechanism to manage cloud services with active QoS refreshing and fast subscribe capability. The registry overlay with multiple managers cooperating on JXTA, can manage large scale services discovery. The service model with QoS describes a formal model for pub/sub based service management, and a fast subscribing algorithm with filter matrix and multi-dimension index is proposed. The filter matrix helps to reduce candidate services and the multi-dimension index is used to find satisfied services fast. Based on pub/sub and JXTA, the cloud management system is realized. The experiments show that the proposed cloud service management mechanism has good publication and subscribing performance, and is faster than traditional methods for large scale cloud services.

CREDIBLE CLOUD SERVICES

The credibility of cloud service is the key to the success of the application of cloud services. The dual servers of master server and backup server are applied to cloud services, which can improve

the availability of cloud services. In the past, the failures between master server and backup server could be detected by heartbeat algorithm. Because of lacking cloud user's evaluation, the paper by Tian Junfeng and Zhang He entitled "A Credible Cloud Service Model based on Behaviour Graphs and Tripartite Decision-making Mechanism" puts forward a credible cloud service model based on behaviour Graphs and tripartite decision-making mechanism. By the quantitative of cloud users' behaviours evidences, the construction of behaviour Graphs and the judgment of behaviour, they select the most credible cloud user. The paper combines the master server, the backup server and the selected credible cloud user to determine the credibility of cloud service by the tripartite decision-making mechanism.

APPLICATIONS OF CLOUD COMPUTING AND BIG DATA SERVICES

On the theoretical basis of cloud services, big data technology and case-based reasoning technology (CBR), the paper by Guanlin Chen, Erpeng Wang, Xinxin Sun and Yizhe Lu entitled "An Intelligent Approval System for City Construction Based on Cloud Computing and Big Data" proposes an Intelligent Approval System for City Construction (IASCC). The paper introduces the concept of 'case approval cloud' and puts forward the city construction approval model based on CBR, by which the storage and computation of the urban construction approval data are concentrated in the cloud. In this system, it uses the distributed database of HBase, making the data storage capacity of the system with high scalability, and uses the distributed full-text retrieval system of SorCloud to retrieve the approval data with a high response speed. IASCC adopts Hadoop as the development platform, using HBase, Solr and MapReduce technology to complete the prototype development of an intelligent approval system.

MapReduce is a widely adopted computing framework for data-intensive applications running on clusters. This paper by Kunfang Song and Hongwe Lu entitled "Efficient Querying Distributed Big-XML Data using MapReduce" proposes an approach to exploit data parallelisms in XML processing using MapReduce in Hadoop. This solution seamlessly integrates data storage, labeling, indexing, and parallel queries to process a massive amount of XML data. Specifically, the paper introduces an SDN labeling algorithm and a distributed hierarchical index using DHTs. More importantly, an advanced two-phase MapReduce solution are designed that is able to efficiently address the issues of labeling, indexing, and query processing on big XML data. The experimental results show the efficiency and effectiveness of our proposed parallel XML data approach using Hadoop.

SUMMARY

This special issue of International Journal of Grid and High Performance Computing covers different aspects of the cloud computing and big data, both from the systems to applications. Five papers were selected by an international editorial committee. We would like to express sincere gratitude to the reviewers for their professional efforts. We are grateful to all authors for their contributions.

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