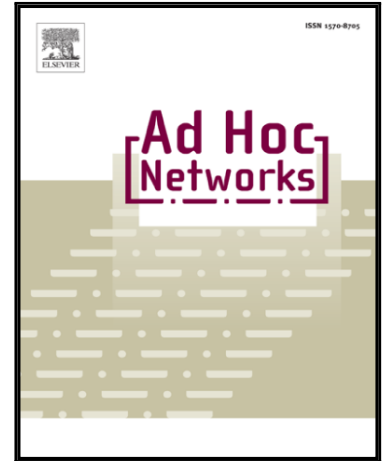


Accepted Manuscript

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PII: S1570-8705(17)30001-X
DOI: [10.1016/j.adhoc.2017.01.001](https://doi.org/10.1016/j.adhoc.2017.01.001)
Reference: ADHOC 1510



To appear in: *Ad Hoc Networks*

Received date: 2 June 2016
Revised date: 14 December 2016
Accepted date: 4 January 2017

Please cite this article as: Shiva Razzaghzadeh , Ahmad Habibizad Navin , Amir Masoud Rahmani , Mehdi Hosseinzadeh , Probabilistic Modeling to Achieve Load balancing in Expert Clouds, *Ad Hoc Networks* (2017), doi: [10.1016/j.adhoc.2017.01.001](https://doi.org/10.1016/j.adhoc.2017.01.001)

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Probabilistic Modeling to Achieve Load balancing in Expert Clouds

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Abstract

Expert Cloud as a new class of Cloud computing systems enables its users to request the skill, knowledge and expertise of people without any information of their location by employing Internet infrastructures and Cloud computing concepts. Effective load balancing in a heterogeneous distributed environment such as Cloud is important. Since the differences in the human resource (HRs) capabilities and the variety of users' requests causes that some HRs are overloaded and some others are idle. The task allocation to the HR based on the announced requirements by the user may cause the imbalanced load distribution among HRs as well. Hence resource management and scheduling are among the important cases to achieve load balancing. Using static and dynamic algorithms, the ant colony, and the method based on searching tree all are among the methods to achieve load balancing. This paper presents a new method in order to distribute the dynamic load based on distributed queues aware of service quality in the Cloud environment. In this method, we utilize the colorful ants as a ranking for making distinction among the HRs capabilities. In this paper, we perform the mapping among the tasks and HRs using allocating a label to each HR. We model the load balancing and mapping process based on Poisson and exponential distribution. This model allows us to allocate each task to the HR which is able to execute it with maximum power using the distributed queues aware of the service quality. Simulation results show that the expert Cloud can reduce the execution and tardiness time and improve HR utilization. The cost of using resources as an effective factor in load balancing is also observed.

Keywords: Expert Cloud, human resource, Cloud computing, load balancing, Poisson distribution, quality of service.

1. Introduction

Human resources (HRs) are the important components of the Societies and organizations so that the Success of each organization depends on its HRs. The organizations achieve their goals by means of Knowledge, experience, strength and skills of human beings. Since the HRs are geographically distributed, it is necessary to establish an infrastructure to share the Knowledge, skills and experience of human beings. This new platform is named Expert Cloud [1].

According to the definition of National Institute of Standards and Technology(NIST) Cloud computing is Internet based computing in which the numerous groups of servers have been networked to allow the sharing of data-processing tasks, centralized data storage and online access to the computer services or resources. In other words, Cloud computing relies on

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