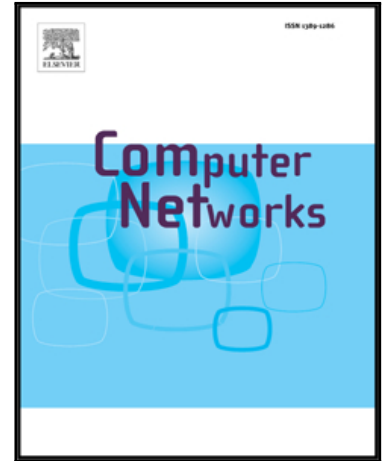


Accepted Manuscript

Load-Balancing Routing in Software Defined Networks with Multiple Controllers

Haibo Wang, Hongli Xu, Liusheng Huang, Jianxin Wang, Xuwei Yang

PII: S1389-1286(18)30223-8
DOI: [10.1016/j.comnet.2018.05.012](https://doi.org/10.1016/j.comnet.2018.05.012)
Reference: COMPNW 6491



To appear in: *Computer Networks*

Received date: 15 June 2017
Revised date: 2 May 2018
Accepted date: 15 May 2018

Please cite this article as: Haibo Wang, Hongli Xu, Liusheng Huang, Jianxin Wang, Xuwei Yang, Load-Balancing Routing in Software Defined Networks with Multiple Controllers, *Computer Networks* (2018), doi: [10.1016/j.comnet.2018.05.012](https://doi.org/10.1016/j.comnet.2018.05.012)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Load-Balancing Routing in Software Defined Networks with Multiple Controllers

Haibo Wang, Hongli Xu¹, Liusheng Huang, Jianxin Wang, Xuwei Yang

School of Computer Science and Technology, University of Science and Technology of China, Hefei, Anhui, China, 230027

Abstract

Software defined networking is a new paradigm that separates the control plane from the data plane. To provide high scalability and reduce the controller load in a large-scale software defined network (SDN), a natural way is to deploy a cluster of distributed controllers so as to cooperatively manage the network. However, since each controller just manages a set of the connected (or associated) switches and usually holds the information of these switches (and connected links), it may result in controller load imbalance and link load imbalance. Thus, both controller load and link load should be optimized to achieve better QoS in SDNs. To this end, this paper tries to answer the following question: *how to perform both controller load balancing and link load balancing in an SDN?* We formulate the load-balancing routing for both links and controllers (LBR-LC) problem in an SDN, and prove its NP-hardness. A rounding-based algorithm is proposed to solve this problem, and the approximation performance is also analyzed. Moreover, we discuss the efficient mechanism for network status maintenance among distributed controllers. The extensive simulation results show that our proposed algorithm can reduce the maximum controller response time by 70% compared with the previous solution, while only increasing the maximum link load by 3%.

Keywords: Software Defined Networks, Controller Load, Link Load, Rounding.

1. Introduction

Software defined networking (SDN) separates the control plane and data plane on independent devices [1]. The controllers can provide centralized and flexible control by installing forwarding rules in the data plane, and the switches perform different operations on packets according to these

¹Corresponding author: xuhongli@ustc.edu.cn

Download English Version:

<https://daneshyari.com/en/article/6882627>

Download Persian Version:

<https://daneshyari.com/article/6882627>

[Daneshyari.com](https://daneshyari.com)