



论文摘要

中南大学学报(自然科学版)

ZHONGNAN DAXUE XUEBAO(ZIRAN KEXUE BAN)

Vol.41 No.3 Jun.2010

[PDF全文下载] [全文在线阅读]

文章编号: 1672-7207(2010)03-1058-07

多发送端拓扑结构中网络链路延迟推断方法

许鑫¹, 何泾沙², 石恒华¹

(1. 北京工业大学 计算机学院, 北京, 100124;
2. 北京工业大学 软件学院, 北京, 100124)

摘要: 为检测多发送端拓扑结构中网络内部延迟情况, 在充分利用路径延迟数据的基础上, 提出一种简单易行的网络链路延迟分布推断方法。在满足网络平稳性、网络链路延迟的时间独立性和空间独立性的假设下, 将复杂的多发送端拓扑结构的网络分解成多个简单的单发送端拓扑结构的分解单元, 采用最大似然估计法并按照分解单元所含链路个数的升序推断各分解单元中的网络链路延迟分布, 使得分解单元中的数据流共享链路延迟分布的真实值和估计值之间的差异逐渐减小。研究表明: 采用该方法能有效推断出复杂的多发送端拓扑结构中网络链路延迟分布情况, 与最小方差权值平均方法相比, 具有较高的精度。

关键字: 延迟; 推断; 拓扑; 最大似然估计; 多发送端

Network link delay inference in multiple-source topology

XU Xin¹, HE Jing-sha², SHI Heng-hua¹

(1. College of Computer Science, Beijing University of Technology, Beijing 100124, China;
2. School of Software Engineering, Beijing University of Technology, Beijing 100124, China)

Abstract: Considering making good use of path delay data, an easily-accomplished method for inferring network link delay distributions was proposed to monitor network internal delay in multiple-source topology. Under the assumptions that the network was stationary, network link delays were temporally and spatially independent, the complex multiple-source network was decomposed into simple multiple single-source decomposition units. The ascending order of the number of links in every decomposition unit was regarded as the inference order for all decomposition units. Maximum likelihood estimation was adopted to infer network link delay distributions for each decomposition unit. The difference between the true and estimated value of network shared data-flow link delay distributions gradually decreased in these inference procedures. Simulation results demonstrate that this method can effectively infer network link delay distributions in complex multiple-source topology, and obtain higher accuracy than the method of minimum variance weighted average.

Key words: delay; inference; topology; maximum likelihood estimation; multiple source

有色金属在线

中国有色金属权威知识平台

版权所有：《中南大学学报(自然科学版、英文版)》编辑部

地 址：湖南省长沙市中南大学 邮编： 410083

电 话： 0731-88879765 传真： 0731-88877727

电子邮箱： zngdx@mail.csu.edu.cn 湘ICP备09001153号