机器学习与数据挖掘

P2P流媒体系统搭便车行为建模研究

刘琪,刘沂训,秦丰林

山东大学网络与信息中心, 山东 济南 250100

摘要：

搭便车行为是指节点仅使用其它节点的资源而不作任何贡献,对P2P流媒体系统的服务质量会产生严重影响。基于两类流体模型对P2P流媒体系统的搭便车行为进行了建模研究,同时考虑了不存在种子节点和存在种子节点两类场景,并对稳态环境下搭便车行为对P2P流媒体系统性能的影响作了定量分析。结果发现,在存在种子节点场景下,诚实节点和搭便车节点的平均下载时间均远低于不存在种子节点场景,因此需要设计相应的激励机制以吸引种子节点留在系统中。而且,搭便车节点比诚实节点更容易从流媒体服务器和种子节点受益,因此需要在流媒体服务器和种子节点引入区分服务机制。

关键词： P2P流媒体　搭便车行为　流体模型　激励机制

Modeling research of free riding in P2P streaming systems

LIU Qi, LIU Yi-xun, QIN Feng-lin

Network and Information Center, Shandong University, Jinan 250100, China

Abstract:

Free riding in peer-to-peer (P2P) systems means a peer utilizing other peers' network resources without contribution, which will cause severe degradation of the service quality in P2P streaming systems. A two-class fluid model was introduced to model and analyze the free riding problem. With this model, two scenarios including without seeders and with seeders were considered, and a quantitative analysis of the effect of free riding on the performance of P2P streaming systems particularly in the steady state was put forth. The result showed that both honest peers and free riders could achieve a much lower download time in the scenario with seeders than that without seeders, and thus it was essential to introduce the mechanisms to incentivize the seeders to stay in the system. The free riders could benefit greatly from the streaming server and the seeders, and thus it is important to introduce differentiated service for the server and seeders in P2P streaming systems.

Keywords: P2P streaming　free riding　fluid model　incentive mechanism

通讯作者:

作者简介: 刘琪(1976-),女,山东济南人,硕士,工程师,主要研究方向为网络流媒体.E-mail:liuqi@sdu.edu.cn
作者Email:

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