

论文

同构流媒体集群系统优化内容部署

卫 星, 杨 坚, 奚宏生

中国科学技术大学自动化系 合肥 230027

收稿日期 2008-10-6 修回日期 2009-4-6 网络版发布日期 2009-9-2 接受日期

摘要

该文研究了在固定节目流行度的情况下, 如何进行内容优化部署以最小化流媒体集群系统拒绝率和降低复制存储消耗的问题。首先运用排队理论知识分析得出优化目标和服务器访问概率之间的数值联系, 并且通过某些数值方法确定出系统最小拒绝率情况下的最优服务器访问概率。由于内容部署属于NP-Hard问题且完全决定每台服务器的访问概率, 该文设计了副本交换和对等副本访问概率调整两种启发式策略来进行内容部署, 以满足在优化内容分布下每台服务器访问概率和最优值之间的差异最小, 从而实现降低系统拒绝率和存储代价的目标。最后分别采用数值分析和离散事件仿真验证了模型的正确性和算法的有效性。

关键词 [流媒体集群系统](#) [内容部署](#) [存储均衡](#) [拒绝率](#)

分类号 [TP393](#)

Optimal Content Distribution on Clustered Streaming Media System Consisting of Homogeneous Configuration

Wei Xing, Yang Jiang, Xi Hong-sheng

Automation Department, University of Science and Technology of China, Hefei 230027, China

Abstract

The optimizing problem of content distribution which minimizes the blocking probability and storage consumption on clustered streaming media system is discussed, in the case of knowing every program's unchanged popularity. Firstly, the queuing theory is adopted to analysis the relationship between the server's access probability and the optimizing goal. The ideal access probability of every server can be obtained by some numerical methods, under the circumstance of minimal blocking probability. Content distribution determining each server's access probability, has been proved to be NP-Hard. The whole content distribution process consists of two strategies, i.e. duplicate swapping and peer duplicate's access probability adjusting. All the heuristic arithmetic is designed to perform the content distribution in order to minimize the distance between the result of optimization and the ideal one, minimize the storage consumption and reduce the blocking probability. Finally, the correctness of system modeling and the efficiency of proposed arithmetic are verified by numerical analysis and discrete event simulation.

Key words [Clustered streaming media system](#) [Content distribution](#) [Storage balancing](#) [Blocking probability](#)

DOI:

通讯作者

作者个人主页 卫 星; 杨 坚; 奚宏生

扩展功能
本文信息
▶ Supporting info
▶ PDF (337KB)
▶ [HTML全文](OKB)
▶ 参考文献[PDF]
▶ 参考文献
服务与反馈
▶ 把本文推荐给朋友
▶ 加入我的书架
▶ 加入引用管理器
▶ 复制索引
▶ Email Alert
▶ 文章反馈
▶ 浏览反馈信息
相关信息
▶ 本刊中 包含“流媒体集群系统”的相关文章
▶ 本文作者相关文章
· 卫 星
· 杨 坚
· 奚宏生