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时隙间迭代的输入队列交换机Round-Robin调度算法

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Abstract

Input-Queueing is becoming increasingly used for high-bandwidth switches and routers for its scalability, but it needs an elaborate scheduling algorithm to achieve good performance. Round-Robin algorithms have been extensively investigated due to its simplicity and parallelism. However, the present Round-Robin algorithms suffer from poor performance under nonuniform and burst traffic. This paper proposes a Round-Robin algorithm named iSLOT, which can approximate the maximum matching algorithms by iterating the scheduling decision between slots and using the randomness of the queue length. Simulation results show that iSLOT not only is stable under uniform i.i.d traffics, but also outperforms the existing round-robin algorithms under burst and nonuniform traffics in throughput and delay performance.

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摘要

输入队列因具有良好的可扩展性而广泛应用于高速交换机和路由器中,但输入队列需要精心设计调度算法以获取较好的性能.Round-Robin算法因其简单性和并行性而得到广泛的研究,但现有的Round-Robin算法在突发流量和非均匀流量下的负荷-延迟性能较差.提出了调度决策在时隙间进行迭代的思想,并利用队列长度具有随机性的特点设计了能近似最大匹配的Round-Robin算法——iSLOT.仿真结果表明,iSLOT不仅在均匀流量下是稳定的,在非均匀流量和突发流量下的吞吐率及延迟性能均远好于现有的Round-Robin算法.

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