

### Web集群的区分服务与负载均衡策略研究

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### Differentiated Service and Load Balancing in Web Cluster

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**摘要** 该文从区分服务和负载均衡两方面研究Web集群系统,设计并实现了一种支持区分服务的负载均衡集群模型,通过系统辨识和资源最优控制,对后端资源统一调度,动态调整每台后端节点不同优先级业务类的资源配额;同时设计了基于业务类的最大空闲节点优先的负载均衡策略以保证各个后端节点同一业务类资源被公平消耗,从而控制端到端延迟,实现比例延迟保证。经实验验证,无论采用轮询调度、最少连接数调度还是最大空闲节点优先的均衡策略,资源最优控制器均能取得良好的区分效果,扩展实验还表明,相对于轮询调度和最少连接数调度,采用最大空闲节点优先的均衡策略,能够使该集群系统在实现比例延迟保证的同时获得最大的性能优化,整体吞吐量提高了25%,平均延迟降低了33%。

**关键词:** Web 集群 负载均衡 区分服务 最大空闲节点优先

**Abstract:** From the view of differentiated service and load balancing, this paper proposes and implements a load balancing cluster architecture supported differentiated service. By system identification and resource optimal control, the front-end dispatcher can adjust the resource quotas assigned to different classes in every single back-end server, and Multi-class based Maximum Idle First (MIF) load balancing strategy is designed to ensure every class a fair consumption among back-end nodes. As a result, the end-to-end delay is controlled and proportional delay is guaranteed. The experiments demonstrate that no matter using Round-Robin (RR), Least Connection Schedule (LCS) or Maximum Idle First load balancing strategy, the proposed resource optimal controller can hold the relationship between different classes. Compared to Round-Robin and Least-Connection First Schedule, Maximum Idle First strategy increases the total throughput by 25% and reduces the average delay by 33%.

**Keywords:** Web cluster Load balancing Differentiated service Maximum Idle First (MIF)

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