

边缘计算下基于 Lyapunov 优化的系统资源分配策略

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摘要: 针对密集的计算任务卸载使得移动边缘计算系统网络开销大以及应用与服务交互延迟高等问题, 提出一种基于 Lyapunov 优化的资源分配策略. 该策略首先在保证用户服务质量需求的情况下, 考虑系统数据队列状态和任务执行开销, 建立系统开销模型; 然后运用 Lyapunov 优化理论设计了一种基于用户设备和边缘计算服务提供商数据队列状态的实时分配方案, 并通过构造拉格朗日乘子函数进行迭代优化. 实验结果表明, 所提方案在保证系统队列稳定性的同时降低了系统平均总开销.

关键词: 移动边缘计算; 任务卸载; Lyapunov 优化; 资源分配; 稳定性

System resource allocation strategy based on lyapunov

optimization in edge computing

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Abstract: In view of the problem about high network overhead and high interaction delay between applications and services due to intensive computation task offloading in mobile edge computing system, a resource allocation strategy based on Lyapunov optimization is proposed. Firstly, the overhead model of the system is established considering system's data queue and task execution overhead while ensuring the user's service quality requirements. Then, a real-time allocation scheme based on user's devices and edge computing service provider data queue is designed by using Lyapunov optimization theory, and it is iteratively optimized by constructing a Lagrangian multiplier function. Experimental results show that the proposed scheme reduces the average overhead of system while ensuring the the queue stability.

Key words: mobile egde computing; task offloading; Lyapunov optimization; resource allocation; stability

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