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基于相遇节点跨层感知的机会网络高效低时延路由算法

Efficient low-delay routing algorithm for opportunistic networks based on cross-layer sensing of encountered nodes

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中文关键词：机会网络 路由算法 相遇节点 感知 跨层设计

英文关键词:opportunistic network routing algorithm encountered node sensing cross-layer design

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作者	单位
任 智，陈 红，徐中浩，李季碧，陈前斌	重庆邮电大学 移动通信技术重庆市重点实验室，重庆 400065

中文摘要：

针对基于epidemic机制的机会网络路由算法未能及时感知相遇节点以及在数据分组交换过程中存在冗余的问题，提出了一种采用跨层感知相遇节点思路的机会网络高效低时延路由算法——ERCES（epidemic routing based on cross-layer encountered-node sensing），通过在物理层、MAC层和网络层之间的跨层信息共享与协同，实现相遇节点及时感知，并且采用节点相遇后立即广播新数据分组、收到SV（summary vector）分组后优先发送目的节点为对方的数据分组、动态自适应发送HELLO分组、借助SV删除节点缓存中已到达目的节点的分组等新机制，减少控制和存储开销，降低分组时延。理论分析验证了ERCES算法的有效性，仿真结果表明：与经典的Epidemic Routing算法及其多个改进相比，ERCES算法的控制开销和存储开销分别减少8.2%和2.1%以上，数据分组平均端到端时延至少降低了11.3%。

英文摘要：

An efficient low-delay routing algorithin, name epidemic routing based on cross-layer encountered-node sensing (ERCES) was proposed to address the issue that the epidemic-based routing algorithms have some extralatency in sensing encountered nodes and extra overhead in exchanging data packets. ERCES achieves to speed sensing encountered nodes through cross-layer design among the PHY, MAC, and network layers. Moreover, to reduce overhead and to decrease data latency, it makes a node send novel data packet immediately after encountering other nodes, sends the packets close-by their destinations firstly after receiving summary vector(SV) packets, adaptively varies the period of HELLO packets, and deletes the packets reaching their destinations from nodes' memory with the help of SVs. Theoretical analysis verifies the effectiveness of ERCES. And simulation results show that ERCES reduces by at least 11.3% the control overhead by at least 8.2%, 2.1% memory overhead by more than 2.1%, and the average end-to-end delay by at least 11.3%.

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