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一种异构环境下覆盖多播网络路由算法

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Abstract
Due to the difficulties in deployment of IP multicast, the overlay multicast networks (OMN) are being increasingly recognized as a viable alternative to construct a general multicast service infrastructure. To settle the heterogeneity of bandwidth required by real-time multimedia application, the multicast routing problem in heterogeneous OMN is discussed. A new network model of heterogeneous OMN is described by extending the degree-constrained model. Adopting the strategy of layered bandwidth allocation, a heuristic routing algorithm, called layered compact tree (LCT) is proposed to build a minimum delay radius multicast tree in heterogeneous OMN. The properties of LCT are also proved and analyzed in theory. The simulation results show that LCT could reduce both hops and network resource usage of the tree effectively, and keep a little increase in delay radius while the allocated bandwidth decreases.

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摘要
由于IP多播在部署上的困难,覆盖多播网络(overlay multicast networks,简称OMN)作为构建通用的多播服务平台的另一可行途径正不断为人们所认可.针对实时多媒体应用对带宽需求的异构性,研讨了异构环境下OMN的路由问题.通过对度约束模型进行扩展,描述了一种新的适应异构环境的OMN网络模型.采用分层的带宽分配策略,提出了一种异构环境下构造OMN最小延时半径多播树的启发式算法——分层的压缩树 (layered compact tree,简称LCT) 算法,并对其性质进行了理论证明和分析.仿真实验结果表明,随着分配带宽的减少,LCT算法能够有效地降低多播树的高度和网络资源使用量,并保持较低的多播树延时半径增幅.

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