A Potential Energy based Clustering Algorithm of Nodes for Network Media Services

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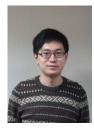
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Abstract—For some media service systems in Internet, providing the service in real time is the key point to obtain the satisfying performance. In order to get good user experience, nodes are often organized as groups and the nodes in a same group can cooperate with each other. Accordingly, how to organize the nodes is an important problem that affects the performance of systems. Usually, enough node capability and the required media content are the two essential elements of nodes to provide the media service. In this paper, the relationship among nodes about these two elements are analogized as the spring tension and gravitation between particles, and a novel potential energy based clustering algorithm is proposed to generate node groups for media services. Moreover, an overlay structure for several media service applications is designed, in which a priority neighbor list is generated for each node by the proposed clustering approach. Based on this structure, nodes in the priority neighbor list may be the potential service helpers in the future. To evaluate our algorithm, a service scenario is simulated and different parameters in the media system are discussed adequately. Compared with some other clustering algorithms, if the potential energy based clustering algorithm is used, there is a chance to improve the service response time obviously and the average execution time of tasks can be reduced.

Keyword-Media service, cluster, potential energy, overlay structure, node group



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