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Efficient Handoff Rerouting Algorithms: A Competitive On-Line Algorithmic Approach

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Abstract

This paper considers the design of handoff rerouting algorithms for reducing the overall session cost in Personal Communication Systems (PCS). Most modern communication systems that are used as an infrastructure for PCS networks are based on connection-based technologies. In these systems the session cost is composed of two components. The setup cost represents the cost associated with the handoff operations and the hold cost determines the expense related to the use of network resources held by the connection. Using an efficient handoff rerouting algorithm is important for the efficient management of PCS networks. This work introduces for the first time rerouting algorithms for general graphs which are cost effective in terms of their worst case analysis. The algorithms are analyzed using a competitive analysis approach and it is proved that the competitive ratio of the proposed algorithms is 3. We also prove that the competitive ratio of the best online algorithm is at least 2, which means that the proposed algorithms are close in terms of worst case behavior to the best possible rerouting algorithm. In addition, experimental results also show that the proposed algorithms indeed balance between the session setup cost and the hold cost, yielding overall lower cost when compared to other algorithms described in the literature.