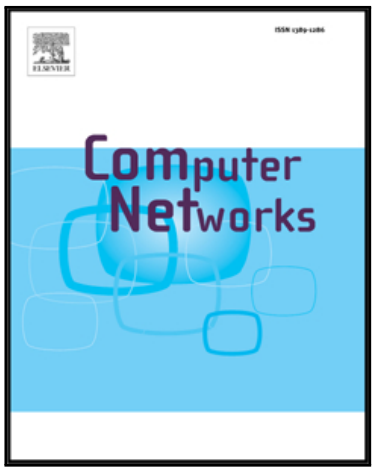

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Analytical Modeling of Multi-Source Content Delivery in Information-Centric Networks

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Abstract

Routers in information-centric networking (ICN) are allowed to maintain the information of several repositories for every content item in their FIB. Therefore, content could be provided from different locations simultaneously, when a consumer asks for it. This multi-source property of content could benefit a network in terms of load balancing, congestion control, resource management and so on. Since exploiting multi-source content delivery has paramount importance, this work is an effort to investigate the performance of multi-source content delivery in the ICN. Existing works for modeling content transportation in ICN do not consider multi-source content delivery nor are straightforward enough to be used. Specially, the existing works do not consider the role of forwarding mechanisms in their models, an issue addressed in this paper. We develop a novel analytical model to evaluate the performance of multi-source content delivery in the ICN. We provide a recursive-style function to calculate virtual round-trip time (VRTT) between a consumer and the collection of providers which host the requested content by the consumer. Other metrics such as content transfer time can be obtained by the estimated VRTT. The proposed model was evaluated via both numerical and simulation methods. Packet-level experiments were performed by an ICN simulator (ndnSIM), and the result demonstrated the accuracy of the proposed model. Moreover, we discussed the distinct features of

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