CTJIF-ICN: A coadjuvant trust joint interest forwarding mechanism in information centric networks

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Abstract

The Information centric networks (ICN) transforms the focal point of current Internet paradigm to data centric approach from host centric approach by allowing content driven forwarding and in-network caching mechanisms. Though NDN (Named data networking) paradigm of ICN assures a secure content communication, it is vulnerable to different attacks by the malicious nodes. To minimize the hazards from compromised nodes and to improve the network security, the remaining nodes should transparently receive information about such nodes. This will restrict the forwarding strategy to exploit these malicious nodes for forwarding interest and content as well. Our protocol introduces a dynamic model for prediction of trust in order to evaluate the node trust. Proposed approach observes the historical behaviors of node and uses extended fuzzy logic rules for the prediction of future behaviors to evaluate the node’s trust value. This prediction model is incorporated within the trust based forwarding mechanism that aims to forward interest through secure and shortest path. The extensive simulation study has been carried out to analyze the protocol performance in ns-3 driven ndnSIM-2.0 simulator for performance metrics such as data discovery latency, packet delivery ratio, network overhead, detection ratio and cache hit ratio. When we integrate our trust joint forwarding strategy to state-of-the-art protocols, their performance is significantly improved up to approximately 10-35\% against stated performance measures for realistic network topology.

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