

# NRIT: Non-Redundant Indirect Trust Search Algorithm for a Cross-Domain based CDNi-P2P Architecture

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**Abstract**—A content delivery network (CDN), as a distributed network architecture, enhances efficient delivery of content. The interconnection of different CDNs (CDNi) further improves efficiency and the experience of end users. As another distributed network with high availability and high performance, a peer-to-peer (P2P) network can provide efficient resource sharing. To combine the advantages of the two networks, we propose a hybrid CDNi-P2P architecture, along with trust management models to achieve more efficient content delivery. In CDNi-P2P architecture, end users can obtain the requested content from the nearest CDN edge server, and can also share these contents with other users in the same domain as a P2P network. After the transactions, users can rate each other based on the reputation evaluation method adopted in the system. For some mobile users, they can move among different domains and share the contents who have with the end users in different system. In general, different systems adopt different reputation evaluation standards. This leads to disparate trust values for mobile users in different systems. Based on the architecture, we propose two trust models to solve this problem: a local trust model and a cross-domain trust model. To evaluate reputation more effectively and accurately, we also propose a search algorithm for the trust model called the non-redundant indirect trust search algorithm (NRIT-SA). Using the proposed trust models, a mobile user can transform his/her local trust into mobile trust in a new domain. We thus avoid disparate trust values for a single user in different domains and improve the availability of the content possessed by mobile users as they move among different domains. The result of the performance analysis shows that when there is a high connectivity degree of users in the system, the calculation time of the proposed NRIT-SA tends to be stable. And depending on the comparison result with the full search algorithm, NRIT-SA shows more efficient calculation performance and more reliable result.

**Keyword**—CDNi, Cross Domain, Mobile, Reputation Evaluation, Trust



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