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Anomaly Detection in Data Access Scheme

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ABSTRACT: A Data access is an important and challenging issue in Networks and caching is an effective technique to improve the access performance. Most of current research efforts in data access of networks focus on improving the access performance while neglecting the fair treatment of users. Because fairness is considered as a major incentive for peer-to-peer service especially in infrastructure-less wireless networks, in this paper propose a novel approach to support Caching Scheme in Networks. Through capturing close friend set of each node, cache data prior at nodes which are overlapped by most nodes' close friend sets. Then the proposed system is to intentionally cache data at a set of Network Central Locations (NCLs), which can be easily accessed by other nodes in the network. An efficient scheme that ensures appropriate

KEYWORDS: Cognitive Radio, Spectrum Sensing, Efficient Communication, System Security, Cache Data.

I.INTRODUCTION

Generally to cache data at appropriate network central locations (NCLs) based on query history, so that queries in the future can be responded with less delay. Although cooperative caching has been used for both web-based application and wireless ad-hoc networks, to allow sharing and coordination among multiple caching nodes, it is difficult to be realized in DTNs due to lack of continuous network connectivity. First, the opportunistic network connectivity complicates the data transmission delay, and furthermore makes it difficult to determine appropriate caching locations for reducing data access delay. This difficulty is raised by the incomplete information at individual nodes about query history. Second, due to the uncertainty of data transmission, multiple data copies are needed to be cached at different locations to ensure data accessibility. In this proposed work introduce an enhancement of data access in DTN with NCL, cooperative data caching as an important technique has been applied in DTNs in recent years [3] [4]. By caching data at nodes which are frequently contacted by others, so that queries in the future can be responded with less delay, and the average access performance (access ratio and access delay) of the whole network is efficiently improved. One of the primary objectives of cognitive radio (CR) ad-hoc networks is to facilitate an efficient utilization of spectrum resources without interfering with the primary user networks. CR-Network allows intermittently connected mobile unlicensed nodes to exploit temporarily available contacts and idle licensed channels for end-to end message delivery. Cognitive Radio (CR) is a key technology to realize Dynamic Spectrum Access (DSA) that enables an unlicensed user (or, secondary user) to adaptively adjust its operating parameters and exploit the spectrum which is unused by licensed users (or, primary users) in an opportunistic manner. However, the realization of CR-Networks also brings crucial research challenges that must be addressed. In particular, due to different node mobility and spectrum availability patterns, CR-Networks is frequently divided into unpredictable partitions. These partitions are essentially intermittently-connected and deficient in complete end-to-end paths. Hence, spectrum-aware flooding (SAF) is more relevant for CR-Networks. In SAF, a message is first copied to a set of path nodes using available channels. Then, one of these path nodes delivers the message to the destination provided that it encounters. Clearly, if the message is tried to be copied to all paths that do not have the message the end-to-end message delay can be minimized. However, such a forwarding strategy is energy-inefficient and may cause a severe interference to primary user system. Hence, it is necessary to decide which path nodes and licensed channels should be used to mitigate the energy consumption and high interference for an efficient communication in CR-Networks.



II. RELATED WORKS

Telecommunication model of the Internet is based on some networking assumptions like it is having a continuous, bidirectional end-to-end path between nodes in the network; ie it assume that there is an end to end connection from the source to the destination, the relatively short round-trip delays.

The network may in a way that where the content generator and requester never connect together. So it is important to make content available in the network so as it may reach to interested users. These regions can be identified only by exploiting local information exchanged by nodes when they meet each other [7].

Cooperative caching and data perfecting techniques for such a connectivity scenario are presented in [10]. This proposal addresses the usability of limited computer networks in remote villages regarding Web pages request and specialized education applications. This approach uses collaborative caching allowing computers within a village to access Web pages stored on other connected machines.

III. DATA ACCESS SCHEME

In this work, a heuristic solution proposed to target the fairness of individuals and meanwhile maintain relatively high performance of data access. Particularly, this work considers that each node maintains the information of its close friend set, and the caching nodes are selected from each node's close friend set. Here this proposed methodology develop an optimization procedure to restrict the scope of caching nodes to satisfy the condition that there is at least one common node between caching node set and each node's close friend set. By this mean, minimize the number of caching nodes while ensuring the fairness of each node at the same time. The proposed basic idea is to intentionally cache data at a set of network central locations (NCLs), which can be easily accessed by other nodes in the network. An efficient scheme that ensures appropriate NCL selection based on a probabilistic selection metric and coordinates multiple caching nodes to optimize the tradeoff between data accessibility and caching overhead.

3.1.1. Network Central Location

The selected NCLs achieve high chances for prompt response to user queries with low overhead in network storage and transmission. A data access scheme to probabilistically coordinate multiple caching nodes for responding to user queries. Furthermore optimize the tradeoff between data accessibility and caching overhead, to minimize the average number of cached data copies in the network.

3.1.2. Caching Node Selection

To leverage the tradeoff between fairness and access performance, and assume a requester is satisfied with the situation when he can receive the file within the file's lifetime. In this caching node selection strategy, to effectively use the caching resource, and desire to use as less caching space and caching nodes as possible to support cooperative caching in MSNs. The basic method is to extract caching nodes from each node's close friend set.. If the caching node set of file k is denoted as C_k , then it can be represented as:

$$C_k = \{i | \forall i \in V, CF_{(i,k)} \cap C_k \neq \emptyset\}, k \in F \quad (4)$$

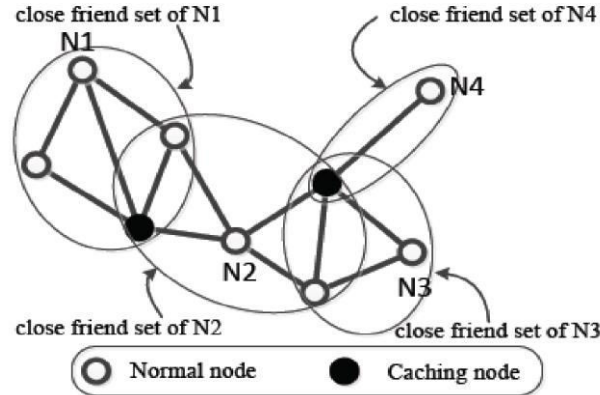


Fig 1: Overview of Friend Set Algorithm

IV. RESULTS AND DISCUSSION

This proposed work is evaluating the effectiveness of caching cost ratio, the ratio of the all nodes' caching space occupied by files, of proposed caching strategy. Through adjusting access probability in proposed scheme and changing number of NCLs in Intentional Cache, set the range of caching cost ratio from 0.1 to 0.9.

4.1.1. Receiver

Receiver is a node which receives batches from remote sender node and then applies them to receiver caches in the same topology data center. First, sender initiates connection to receiver node through a handshake request. Receiver ensures that protocol versions and marshallers are the same in both sender and receiver hubs. If so, receiver accepts handshake. Then, sender begins sending batches to receiver. Once batch is received, receiver node applies it to corresponding receiver cache. Once batch is applied, receiver answers sender node with acknowledge.

Minimize Caching Nodes: If view a node's close friend set as a vertex being adjacent to some other vertices in graph theory, the problem of determining optimal minimum number of caching nodes in Def. 1 can reduce to standard minimum dominating set, At first select the node which appears most frequently in all nodes' close friend sets as a caching node. Then select node appearing most frequently (except for nodes already being selected as caching nodes) in all nodes' close friend sets, and so on, until each node's close friend set has at least one node is chosen as caching node.

V. PERFORMANCE EVALUATION METRICS

In communication networks, two general fairness indexes have been frequently used to measure the fairness of nodes in networks :

$$1) \text{ Gini index: } I_{Gini} = \frac{1}{2n\bar{x}} \sum_i \sum_j |x_i - y_j| \quad (8)$$

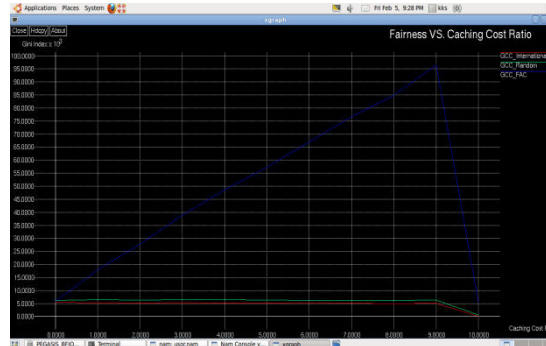
$$2) \text{ Jain index: } I_{Jain} = \frac{|\sum_{i=1}^n x_i|^2}{n \sum_{i=1}^n x_i^2} \quad (9)$$

,where n is the total number of users, x_i is the performance of user i, and \bar{x} is the average performance of all users. Both of the indexes are in the range from 0 to 1. The smaller Gini index, the more fair it is. While the smaller Jain index, the more unfair it is. In this work used these indexes to quantify fairness of cooperative caching scheme in DTNs. To evaluate the performance of the proposed cooperative caching scheme, use and compare the following two metrics:

1) Average access ratio, the average ratio of queries sent by all the requesters in the network being satisfied with the file within its lifetime.

2) Fairness, the difference of individual access ratio, which will quantify this fairness by Gini and Jain index, respectively. To further understand the performance of proposed scheme, compare this proposed scheme to the following two caching strategies:

Fairness vs. caching cost ratio:



One of the problems impacting the e-commerce business is the absence of a well-established distributed network and supply chain. The corporation engages in a variety of dubious practises to keep control over its supply chain. It is difficult for customers to verify the authenticity of each link in the supply chain. Or, a vendor can attempt to promote synthetic meals as organic by using low-quality components in the production process. By implementing blockchain technology into the administration of the e-commerce supply chain, it may be possible to reduce the occurrence of such errors. As a result of blockchain's immutability as well as transparency, all links in the supply chain will be held accountable. It enables consumers to learn more about the history of the products they purchase. [13]. Trade Lens is a blockchain-based supply chain management system developed by Maersk and IBM. Maersk is a global leader in supply chain management. The system constantly updates all links in the supply chain with information about shipments and their statuses. The system will decrease paperwork and human labour while also allowing for speedier shipment [13]. To improve their supply chains, e-commerce companies may use blockchain technology. It will provide a secure, trustworthy, authentic, and accurate system for tracking items in transit. Clients and merchants may track packages in real time.[12]. Using electromagnetic frequencies identifying tags and sensing technologies, tracking and record-maintaining may be made easier. It enables merchants and buyers to track a product's journey through the various stages of the e-commerce system. At present, IBM is applying blockchain technology to the mining and metals sectors [16]. Costs in the supply chain may be reduced by shortening or even eliminating the number of intermediaries between the company and the end consumer. Furthermore, it is probable that internet shops might need minimal personnel resources to manage merchandise

VI.CONCLUSION

In this paper, a novel approach proposed to support caching in Networks, which enables the fair sharing and coordination of cached data among multiple nodes. Specifically, through analysis each node's close friend set cache data prior at nodes which are overlapped by more nodes' close friend set. The optimal caching node selection scheme is derived and designs a heuristic algorithm to solve it. The basic idea is to intentionally cache data at a set of NCLs, which can be easily accessed by other nodes. This work ensured appropriate NCL selection based on a probabilistic metric; the proposed approach coordinates caching nodes to optimize the tradeoff between data accessibility and caching overhead.

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BIOGRAPHY



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