EFFICIENT DATA ACCESSIBILITY AND REDUCING CACHING OVERHEAD IN DTN'S THROUGH USING NCL'S

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Abstract

Disruption tolerant networks (DTNs) are characterized by low node density, unpredictable node mobility, and lack of global network information. Most of current research efforts in DTNs focus on data forwarding, but only limited work has been done on providing efficient data access to mobile users. In this paper, we propose a novel approach to support cooperative caching in DTNs, which enables the sharing and coordination of cached data among multiple nodes and reduces data access delay. Our 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. We propose 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. Extensive trace-driven simulations show that our approach significantly improves data access performance compared to existing schemes.

Keywords - *Cooperative caching, disruption tolerant networks, data access, network central locations, cache replacement.*

1.Introduction

Distruption tolerant networks (DTNs) consist of mobile devices that contact each other opportunistically. Due to the low node density and unpredictable no demobility, only intermittent network connectivity exists in DTNs, and the subsequent difficulty of maintaining end-to end communication links makes it necessary to use "carry and-forward" methods for data transmission. The key problem is, therefore, how to determine the appropriate relay selection strategy it is desirable that smart phone users can find interesting digital content from their nearby peers.

2. Existing system

A common technique used to improve data access performance is caching, i.e., to cache data at appropriate network locations based on query history, so that queries in the future can be responded with less delay. Although cooperative caching has been studied for both web-based applications and wireless ad hoc networks to allow sharing and coordination among multiple caching nodes.

2.1 Proposed system

In this we propose a novel scheme to support cooperative caching in DTNs. Our basic idea is to intentionally cache data at a set of NCLs, which can be easily accessed by other nodes. We ensure appropriate NCL selection based on a probabilistic metric; our approach coordinates caching nodes to optimize the tradeoff between data accessibility and caching overhead.
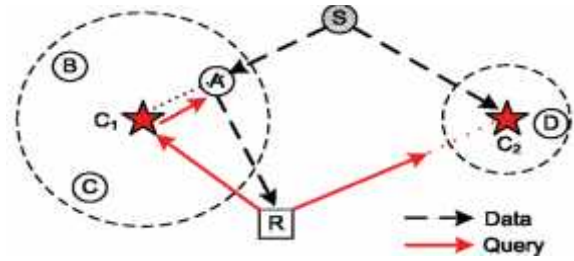
3.Equations

$$p_Y(x) = \sum_{k=1}^{r} C_k^{(r)} p_{X_k}(x),$$

4. Figures and Tables

4.1Figures
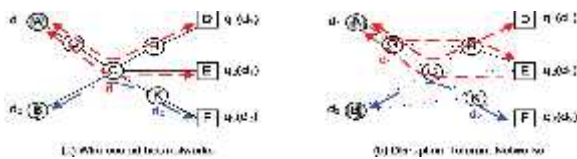
This figure shows the Caching strategies in different network environments.

The big picture of intentional caching.

4.2 Tables

TABLE 1
Trace Summary

Trace	Infocom05	Infocom06	MIT Reality	UCSD
Network type	Bluetooth	Bluetooth	Bluetooth	WiFi
No. devices	41	78	97	275
No. contacts	22,459	182,951	114,046	123,225
Duration (days)	3	4	246	77
Granularity (secs)	120	120	300	20
Avg. inter-contact time (hours)	3.43	1.83	84.13	47.17

This table shows the summary of the trace.

4. conclusion

In this paper, we propose a novel scheme to support cooperative caching in DTNs. Our basic idea is to intentionally cache data at a set of NCLs, which can be easily accessed by other nodes. We ensure appropriate NCL selection based on a probabilistic metric; our approach coordinates caching nodes to optimize the tradeoff between data accessibility and caching overhead. Extensive simulations show that our scheme greatly improves the ratio of queries satisfied and reduces data access delay, when being compared with existing schemes.

5. Acknowledgments

References

[1] W. Gao, G. Cao, A. Iyengar, and M. Srivatsa, "Supporting Cooperative Caching in Disruption Tolerant Networks," Proc. Int'l Conf. Distributed Computing Systems (ICDCS), 2011

[2]   A T. Spyropoulos, K. Psounis, and C. Raghavendra, "Efficient Routing in Intermittently Connected Mobile Networks: The Single-Copy Case," IEEE/ACM Trans. Networking, vol. 16, no. 1, pp. 63-76, Feb. 2008.

[3] B. Tang, H. Gupta, and S.R. Das, "Benefit-Based Data Caching in Ad Hoc Networks," IEEE Trans. Mobile Computing, vol. 7, no. 3, pp. 289-304, Mar. 2008.

[4] J. Zhao, P. Zhang, G. Cao, and C. Das, "Cooperative Caching in Wireless P2P Networks: Design, Implementation, and Evaluation," IEEE Trans. Parallel & Distributed Systems, vol. 21, no. 2, pp. 229-241, Feb. 2010.
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