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Social Wireless Networks By Distributed Cooperative Caching Policy

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ABSTRACT

Cooperative caching policies are being introduced in this paper for minimizing the content provisioning price in Social Wireless Networks. By distribution of similar interest in electronic contents, and physically gathering together in public areas a Social Wireless Networks are established using mobile type of devices which are data enabled cells, electronic book readers etc. Social Wireless Networks can minimize the content provisioning price for electronic object caching which depends heavily on the service and pricing dependencies among various stakeholders including content providers (CP), network service providers, and End Consumers (ES). This paper establish real time networks, services, and pricing models which are then used for creating two objects caching strategies for minimizing content provisioning costs in networks with homogeneous and heterogeneous objects demands. This paper uses analytic and simulation models for analyzing the new caching methods in the presence of selfish users that deviate from network-wide cost-optimal rules. It then gives outcome from an Android phone-based prototype Social Wireless Network , the presented analytic and simulation results are then gets authenticated.

Keywords— Social Wireless Network, Cooperative caching, selfish user, Content provisioning, ad hoc networks.

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I. INTRODUCTION

1.1 Motivation

The new techniques of data enabled mobile systems and Wireless-enabled data applications have made it high level for new content publication models in today's mobile ecosystem. A record of such devices includes I Phone, Android phones Amazon's kindle and electronic book readers from most of the dealers. The collection of data applications has different mobile phone apps. The level of conception of mobile applications is given by the evidence that as of October 2010, apple's app store supplied over 100,000 apps that are available to the smart phone users. With the current download scheme, a user downloads contents directly from a content providers' (CP) server over a communication service providers' (CSP) network. Downloading data through communication service provider's group involves a price which must be paid either by customers or by the content provider. In this creation we take on Amazon kindle electronic book delivery selling model in which the (Amazon) pays to sprint, the communication service providers, for the cost of network usage due to downloaded electronic books by kindle clients. When users carrying mobile devices physically gather in settings such as colleges, business places, shopping marts, Airport and other public places, Social Wireless Networks can be assembled using ad hoc wireless connections between the devices. With the existence of such Social Wireless Networks, another approach to content access by a device would be to first search the local Social Wireless Networks for the requested content before downloading it from the CP's server. The desired content provisioning price of such an approach can be significantly lower since the download cost to the communication service providers would be avoided when the content is found within the local Social Wireless Networks. This method is known as cooperative caching. In order to encourage the End-Consumers (EC) to cache previously downloaded content and to share it with other customers, a peer-to-peer allowance mechanism is used. This mechanism can deliver as an incentive so that the end-consumers are enticed to participate in cooperative content caching in spite of the storage and energy price. For cooperative caching to give price benefits, this peer-to-peer rebate must be dimension-ed to be smaller than the content download cost given to the communication service providers. This rebate should be factored in the content provider's overall price. Due to their limited storage, mobile handheld devices are not expected to store all downloaded content for long. After downloading and using a purchased electronic content, a device can discard it from the storage. For example in Amazon Kindle clients (iPhone, iPad, etc.) an archive mode is available using which a user simply removes a book after reading it, although it lefts archived as a purchased item in Amazon's cloud server.

1.2 Optimal Solution

For contents with varying level of demand, a eager method for each node would be to store as many sharply popular contents as its storage allows. This method adds to noncooperation and can evolve to heavy network-wide data duplication. In the other extra cases, which are fully interdependent, a terminal would try to generate the best of the total number of single contents stored within the Social Wireless Networks by discarding duplication. We are showing that none of the above methods can minimize the content provider's charge. For a given rebate-to-download-charge ratio, there exists an object available for placement policy which is somewhere in between those two ends, and can maximize the content provider's price by striking a balance between the greediness and full cooperation.

This is known as optimal object placement rule in the rest of this paper. The desired cooperative caching algo strive to gain this best object placement with the target of minimizing the network-wide content provisioning price.

1.3 User Selfishness

The possibility for deriving peer-to-peer rebate may motivate selfish activities in some clients. A selfish client is who deviates from the network-wide finest methods for receiving more rebates. Any characteristic from the optimal policy is desired to incur higher network-wide provisioning price. We are modifying the impacts of such selfish nature on object provisioning price and the acquired refund within the context of a Social Wireless Networks. It is given that after threshold selfish nodes, the number of per-node rebate for the selfish users is lower than that for the unselfish users. In increased terms, when the selfish terminal population enlarges to certain point, selfish routines discontinue establishing more advantage from a refund standpoint.

ORGANIZATION

The paper is organized as follows: Network, Service and Pricing Model is presented in Section II. Caching For Optimal Object Placement in Section III. The Proposed Model detailed in Section IV. Advantages of propose model in Section V. We conclude in Section VII.

II. NETWORK, SERVICE AND PRICING MODEL

2.1 Network Model

Fig.1 describes a model Social Wireless Network within a University Campus. People having mobile devices form Social Wireless Network partitions are the end customers, which can be anyone from multi-hop (i.e. MANET) as shown for partitions first, third one, and fourth, or single hop contact point based as shown for partition 2. A movable device can get some data (i.e., content) from the CP's server using the CSP's mobile phone system, or from its home Social Wireless Network partition. In the remaining paper, the terms object and content are used anonymously. We use two types of Social Wireless Networks. The foremost one includes Social Wireless Network partitions without motion. Meaning, after a partition is established, it is available for sufficiently long so that the cooperative object caches can be used and get fixed states. We also think about a second type to use it when the still assumption is relaxed. To query this impact, caching is given to Social Wireless Networks established using human interaction traces got from a set of real Social Wireless Network nodes.

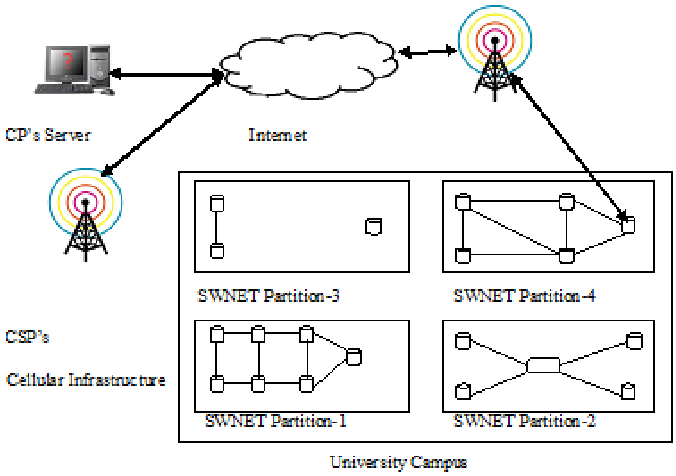

Fig. 1 Content access from a SWNET in a University Campus

2.2 Search Model

After an object call is created by a mobile tool, it first searches for its local cache. If the local search gets discarded, it searches the object within its Social Wireless Network division using defined transmit note. If the search in division also does not succeeds, the data is downloaded from the CP's server using the CSP's 3G/4G cellular settlement. We have used objects such as electronic books, music, etc., which does not differ on time, and therefore cache constancy is not a serious issue. Firstly we are introducing that all objects have the equivalent size and each terminal is capable to store up to "C" dissimilar data in its cache. After that, we let go this supposition to assist objects with variable size. We also know that all objects are popularity-tagged by the CP's server. The popularity-tag of an object gives its universal acceptance; it also shows the chances that a subjective request in the network is created for this specific object.

2.3 Pricing Model

We are using a pricing model which is same as the Amazon Kindle business model in which the CP (e.g., Amazon) pays a download price Cd to the CSP when an End-Consumer uses an object from the CP's server through the CSP's mobile phone network. Moreover, at any time an EC gives a nearby cached object to another EC within its home Social Wireless Network division, the supplier EC is given a refund Cr by the CP. This return can also be assigned among the provider EC and the ECs of all the transitional mobile devices that take part in content forwarding. Cd belongs to the CP's object delivering price when it is given through the CSP's network, and Cr belongs to the rebate given out to an EC when the object is searched within the Social Wireless Network (e.g., node A receives rebate Cr after it gives a content to node B over the Social Wireless Network).

III. CACHING FOR OPTIMAL OBJECT PLACEMENT

3.1 Split Cache Replacement

To know the optimal object placement under homogeneous object request model we establish the following Split Cache rule in which the available cache space in each device is distributed into a duplicate segment and a unique segment. In the first segment, nodes stores the known objects without caring about the object duplication and in the second segment only unique objects are being stored. Among the Split Cache replacement policy, almost after that an object is downloaded from the CP's server, it is assigned as only one of its kind object as there is only one replica of this object in the network. Whenever a node downloads an object from another Social Wireless Network node, that object is classified as a replica object as there are now at least two replicas of that object in the network. For saving a new privileged object, the slightest popular object in the whole cache is chosen as a candidate and it is recovered with the new object if it is less popular than the new received object. For a duplicated object, however, the candidate is selected only from the first similar segment of the cache. In other words, a unique object is not dispossessed in order to put up a cloned object. The Split Cache object restoration mechanism recognizes the optimal strategy. With this method, at stable state all devices' caches preserve the same object set in their matching areas, but distinct objects in their unique areas.

IV. PROPOSED SYSTEM

In this paper detailing encouragement from Amazon's Kindle e-book delivery commerce, this paper creates up real system, service, and pricing models which are used for developing two object caching methods for limiting content provisioning costs in networks with homogenous and heterogeneous object appeals. The paper establishes logical and imitation models for inspecting the designed caching methods in the happening of selfish users that deviate from system-wide cost-optimal plans. It also shows outcomes from an Android cell phone based model Social Wireless Networks, authenticating the presented logical and imitation outcomes.

V. ADVANTAGES OF PROPOSED SYSTEM

Based on a acceptable duty and pricing case, a debatable model for the content provider's price computing is created. A cooperative caching method, Split Cache, is desired, numerically analysed, and theoretically confirmed to give best possible object placement for systems with homogenous content requirements. A benefit-based approach, Distributed Benefit, is used to minimize the provisioning price in heterogeneous networks consisting of nodes with different content request rates and patter.

VI. CONCLUSIONS

The main aim to this work was to develop a cooperative caching strategy for provisioning cost minimization in Social Wireless Networks. The key improvisation is to display that the best cooperative caching for provisioning cost reduction in networks with homogeneous content demands requires an optimal split between object duplication and individuality. In addition to that, we experimentally (using simulation) and analytically evaluated the algorithm's performance in the presence of user selfishness. It was well known that selfishness increases user rebate whenever there are selfish nodes in a Social Wireless Network having less than a critical number. It was given that with heterogeneous requests, a profit based heuristics methods gives better achievements compared to split cache which is desired mainly for homogeneous request. Ongoing work on this topic uses the development of an efficient algorithm for the heterogeneous call scenario, with aim of bridging the achievements gap between the profits Based heuristics and the centralized greedy method which was convinced to be optimal Removal of the no-collusion belief for user selfishness is also being worked on.

Future work on this topic have the development of an efficient algorithm for the heterogeneous demand scenario, with a goal of bridging the performance gap between the Benefit Based heuristics and the centralized greedy mechanism which was proven to be optimal in can be removal of the no-collusion assumption for user selfishness is also being worked on.

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