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Scheduling Mechanism in Wireless Networks

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Abstract: **The rapid growth of wireless content access implies the need for content placement and scheduling at wireless base stations. Here study a system under which users are divided into clusters based on their channel conditions, and their requests are represented by different queues at logical front ends. Requests might be elastic (implying no hard delay constraint) or inelastic (requiring that a delay target be met). Correspondingly, we have request queues that indicate the number of elastic requests, and deficit queues that indicate the deficit in inelastic service. In this project, content caching and scheduling are monitored. The user will send request to the server when the base station doesn't have that file. The user who receives the file will become the base station for that file. To reduce memory consumption, when other user request the same file the base station send s that file delete it. The receiving user will become the base station for that file.**

Keywords: **rapid growth of wireless content access implies placement and scheduling at wireless base stations.**

I. INTRODUCTION

The rapid growth of wireless content access implies the need for content placement and scheduling at wireless base stations. Content might include streaming applications in which chunks of the file must be received under hard delay constraints, as well as file downloads such as software updates that do not have such hard constraints. The core of the Internet is well provisioned, and network capacity constraints for content delivery are at the media vault and at the wireless access links at end-users. Hence, a natural location to place caches for a content distribution network (CDN) would be at the wireless gateway, which could be a cellular base station through which users obtain network access. Furthermore, it is natural to try to take advantage of the inherent broadcast nature of the wireless medium to satisfy multiple users simultaneously.

In the existing system, there are multiple cellular base stations (BSs), each of which has a cache in which to store content. The content of the caches can be periodically refreshed through accessing a media vault. The following constraints affect system operation: 1) the wireless network between the caches to the users has finite capacity; 2) each cache can only host a finite amount of content; and 3) refreshing content in the caches from the media vault incurs a cost.

II. LITERATURE REVIEW

2.1 User request:

Users can make two kinds of requests, namely: 1) elastic requests that have no delay constraints, and 2) inelastic requests that have a hard delay constraint. Elastic requests are stored in a request queue at each front end, with each type of request occupying a particular queue. Here, the objective is to stabilize the queue, so as to have finite delays. For inelastic requests, Here adopt the model users request chunks of content that have a strict deadline, and the request is dropped if the deadline cannot be met. The idea here is to meet a certain target delivery ratio .Each time an inelastic request is dropped, a deficit queue is updated by an amount proportional to the delivery ratio. I would like the average value of the deficit to be zero.

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2.2 Clusters:

Here divide users into different clusters, with the idea that all users in each cluster are geographically close such that they have statistically similar channel conditions and are able to access the same base stations. The requests made by each cluster are aggregated at a logical entity that we call a front end (FE) associated with that cluster. The front end could be running on any of the devices in the cluster or at a base station, and its purpose is to keep track of the requests associated with the users of that cluster.

2.3 Queues:

Elastic requests are stored in a request queue at each front end, with each type of request occupying a particular queue. Here, the objective is to stabilize the queue, so as to have finite delays. For inelastic requests, we adopt the model proposed in wherein users request chunks of content that have a strict deadline, and the request is dropped if the deadline cannot be met. Each time an inelastic request is dropped, a deficit queue is updated by an amount proportional to the delivery ratio.

III. SYSTEM MODEL

There are multiple cellular base stations (BSs), each of which has a cache in which to store content. The content of the caches can be periodically refreshed through accessing a media vault. We divide users into different clusters, with the idea that all users in each cluster are geographically close such that they have statistically similar channel conditions and are able to access the same base stations.

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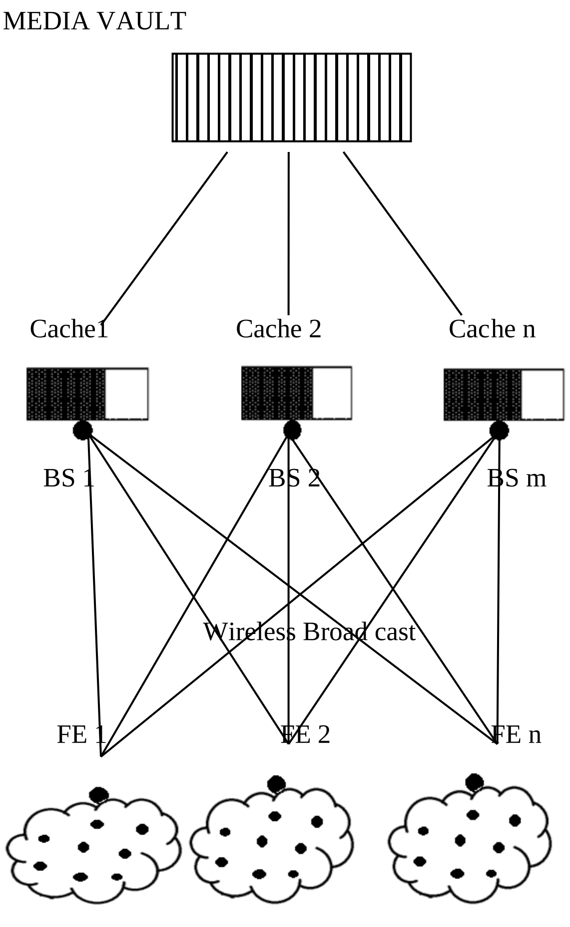

System Architecture

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There is a set of base stations *M* and each base station is associated with a cache. The caches are all connected to a media vault that contains all the content. The users in the system are divided into clusters based on their geographical positions, and let *N* denote the set of these clusters. There are front ends in each cluster, also denoted by *n € N* whose purpose is to aggregate requests from the users. Time is slotted, and we divide time into *frames* consisting of *D* time-slots. Requests are made at the beginning of each frame. There are two types of users in this system—inelastic and elastic—based on the type of requests that they make. Requests made by inelastic users must be satisfied within the frame in which they were made. Elastic users do not have such a fixed deadline, and these users arrive, make a request, are served, and depart.

The base stations employ multiple access schemes, and hence each base station can support multiple simultaneous unicast transmissions, as well as a single broadcast transmission. It is also possible to study other scenarios using our framework. Assume that all pieces of content have the same size, and we call the unit of storage and transmission as a *chunk.* When a channel is ON, it can be used to transmit at most one chunk (per slot).Content is partitioned into two disjoint sets of inelastic content and elastic content.

3.1unicast communications:

*R*equests are to be served using unicast communications. For notational convenience, we assume that transmissions are between base stations and frontends, rather than to the actual users making the requests. First determine the *capacity region*, which is the set of all feasible requests .Note that this model, in which front ends have independent and distinct channels to the caches, differs from the previously studied wired caching systems because the wireless channels are not always ON. Therefore, the placement and scheduling must be properly coordinated according to the channel states.

3.2 Content expiry:

In this section, we study an inelastic caching problem where the contents expire after some time. In this new model, which is compatible with real-time streaming of live events, we only consider inelastic traffic and assume that the lifetime of an inelastic content is equal to the length of a frame. Hence, we can cache a content only for the duration of a frame after which the scontent will not be useful any longer.

IV. DISCUSSION

4.1 memory consumption:

In the existing project, same contents will be stored in the multiple base stations. User request for the content which is already stored in the multiple base stations. In this case the user will get confused in forwarding the request. The user will get collapsed and send request to multiple base stations. To overcome this problem scheduling part is concentrated mainly in this project.

In the content caching and scheduling instead of having multiple base stations for the same content, one base station will have the content. To achieve this kind of scheduling type, when users make the request for the content stored in the base station the base station send the content and it delete the requested content automatically. The user who receives the content becomes the base station for that specific content. In this way the scheduling will take part and the multiple base stations for the same content will be avoided.

V. CONCLUSION

In the content caching and scheduling instead of having multiple base stations for the same content, one base station will have the content. Multiple base stations will be available but duplicated contents will be restricted. Same contents will not be stored in multiple base stations. Memory consumption will be low in the base stations. It stabilizes the system load within the capacity region. Also minimizes the average expected cost while stabilizing the deflect queues.

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