20XW61 – MOBILE COMPUTING

20PW31 – SAMBANTHAM P

Call-to-Mobility Ratio:

The mobile users in a PCS can be characterized by their call-to-mobility ratios (CMRs). If calls are received by the user at an average rate λ and the time the user resides in a given RA has average value $1/\mu$, then, the CMR, denoted as ρ, is given by

$$\rho = \lambda/\mu$$

It is calculated as the ratio of the number of calls made while a subscriber is in motion (i.e., roaming) to the total number of calls made by the subscriber. RA is the roaming activity. Mobile terminal needs to update its location only when the mobile terminal does not engage communications with the fixed communication infrastructure. The concept of call-to-mobility is important because it allows for more flexible and mobile communication, enabling users to stay connected regardless of their location or the device they are using. The call-to-mobility ratio is a measure of how often mobile device users transition their ongoing communication sessions from one device or network to another without interruption. In general, lazy caching tends to perform better than eager caching in mobile environments with a high call-to-mobility ratio.

SYSTEM MODEL:

The system model in mobile computing refers to the variables and parameters used to analyze the performance and cost of various mobile computing systems. In the given system model, the following variables are defined.

Let C be the location updating cost of the callee whenever he moves to a new LA.

Let cv be the cost of updating/querying the cache in the caller's VLR.

Let Ch be the cost of querying the HLR of the callee.

Assume Ch > cv means that querying the HLR of the callee is more expensive than updating/querying the cache in the caller's VLR

Eager Caching:

The mobile device pre-fetches and caches data in advance, assuming it will be needed in the future. This is done to reduce the time and resources needed to retrieve the data when it is requested by the application. Eager caching works by predicting which data will be needed by the mobile application in the near future and proactively fetching and caching that data before it is actually requested. The advantage of eager caching is that it can reduce the delay in accessing the data, as the data is already available in the cache when it is requested by the application. This can improve the overall performance of the application, particularly in situations where network connectivity is limited or unreliable. However, eager caching has some limitations. First, it requires additional resources, such as memory and processing power, to cache the data in advance. Second, it can be less effective in environments with high call-to-mobility ratios, where mobile devices