Performance of Call admission Control for Multi Media Mobile Network with Multi beam Access Point

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ABSTRACT:-

A performance of call admission control scheme in different classes of calls may have different bandwidth requirement, different request call holding timings and residence times. At any time, each call of the network has the capability to provide service to at least a given number of calls for each call of calls. When the multi beam directional antennas are introduced in this system, then we shall have many challenging problems. In this system, then we have many challenging problems.

In this paper we propose a noble network protocol to carefully examine performance of call admission control for multimedia network, for each class of new and handoff this mobile network.

INDEX TERMS:

Call admission control. Directional antennas, Multibeam Access point, Multimedia Network, Multiple input multiple outputs (MEMO)

INTRODUCTION:

With the development of Multimedia from the stand point of a system

Administrator, this property provides an alternative for resource planning, especially forbandwith, allocation/ reallocation in wireless multimedia networks. The system may need to block incoming users of all of the bandwidth
has been used up to provide the highest QoS to existing users. And in mobile network local access, there is an increasing demand to improve throughput and energy efficiency for data transmission between terminals and an access point. Multibeam smart antennas bring two major benefits, spatial reuse and antenna gain, both of which are useful in improving the mobile communication efficiency. Therefore it is of great interest to consider the use of multibeam smart antenna in a mobile network, especially anthraces point. The access point is generally more powerful with less physical constraint than mobile terminals.

Recently these have been some research devoted to optimizing the mutual information of a MIMO system with interference [4]-[8]. For example, in [7-[9], signaling methods we developed to optimize the mutual information of a MIMO system where the user is one cell suffers from the co-channel interference from the users in other cells. In [10], the problem of non-reciprocal interference was recognized in case of adaptive modulation in general. A simple feedback method was developed to compensate for it is a fate single antenna transmission scenario.
The paper [11-12] showed that these two variables are dependent and derived a new degradation ratio. Also they argued that another new performance metric, the frequency of switching between different quality levels, should also be taken into accounts because users may feel more disturb by frequent switches quality levels than by poor but steady quality.

To design a cellular mobile network, comparison needs to be made between the performance measures of different protocol. Mobile which provides a multiple call analysis with an MIMO is developed for the majority of networks. in this paper we formulated and steady an adaptive performance of call admission control for Multimedia mobile network with Multiple cells , Multiple classes of calls and fairness consideration . the cellular networks here is characterized by the requested call holding time, call residence time and new call arrival process as well as capacity restriction on the number of calls due to limited bandwidth. And here we present the system model and identity the design challenges. Then we present our proposed protocol tree MEMO

Call Admission Control:

The handle a Multiservice for Multimedia Network (MMMN) it is very important to employ the call admission control mechanism. First call admission control is a critical step for the provision of QoS quarantined service because it can prevent the system capacity from being overused. Second, call admission control can help the MMMN provide different classes of traffic load with different priorities by manipulating their blocking probabilities. In a MMMN system, CAC is used to accept or reject connection request based on the state information and the QoS requirement of these connection. Now we consider a Multimedia Mobile communication networks. Consists of J connected cells. There are U classes of calls (telephone, video, etc…, but for convenience we shall call all of them calls). The other assumptions and notations for this wireless mobile network are as follow.

(1) the required bandwidth of class u calls (u=1,……U) is form the minimum bandwidth requirement b_{ju} to the maximum bandwidth requirement B_{ju} ($0<b_{ju} \leq B_{ju}$) in cell j(j=1,2….. J). if a call gets the maximum bandwidth for communication , it gets the worst but acceptable QoS from the network.

(2) Cell is consists of M_j channels. To be fair to each class of call sin each cell, cell j reserve $K_{ju}B_{ju}$ ($K_{ju}>0$) channels, for class u calls. Notice that only the number of channels, not individual channels are reserved [13]. This implies that

any time cell j will have the capability to provide the minimum QoS level service for at least K_{ju} class u calls simultaneously .Please refer to the conclusion part for an explanation to a related situation.

(3) To give priority to handoff calls, a threshold value ($T_{ju} >> K_{ju}$) in cell j is predetermined and specified for class u calls. This therehold value means that a class u new call request is admitted if and only if,(a) the number of class u calls in cell j less than T_{ju},(b) there is at least b_{ju} available channels in cell j after possible degradation QoS for other existing calls (see II B for the degradation description),and (c) the constraint in item 2 above is not violated after admitting this class u new call. A handoff request is admitted provided there are minimum required bandwidth for this call after possible degradation QoS for other calls and that the constraint in item 2 above is not violated after admitting this class u handoff call. Clearly, $_{ju}$should satisfy $\sum_{u=1}^{U} T_{ju}\, b_{ju} \leq M_j$.

(4) Class u new calls are generated in cell j according to a Poisson process with rateλ_{ju}, 1……U. The requested call connection time (RCCT). Which is defined as the total length of time that a call initial requests to use a channel, of a class u new call at cell j, $H_{ju}$is exponentially distributed with mean 1/ H_{ju}. the cell residence time, which is defined as the length of a time a call stays in the cell and which is depends on the velocity and the direction of the mobile terminal, of a class u call in cell j, R_{ju},is exponentially distributed with mean 1/ r_{ju}.

(5) The probability that a class u call moves from cell j to a neighboring cell k, given that it moves to a neighboring cell before the call is completed ,is P_{ju}ku, where $\sum_{k=1}^{j}$ P_{ju},ku,=1. clearly, P_{ju},ju=0 and cell k is a neighboring cell of j if and only if P_{ju},ku>0.

(6) As desired above, a class u new call at cell j gains at least b_{ju}channels for communication if it arrives and finds there are less than T_{ju} class u calls in the cell. There is at least b_{ju} channels available and the constraint in item 2 is still not violated after admitting this class u call. If any of these condition is not satisfied ,then the new call will be cleared from the network with probability r_{ju},0 or will push out a class u call in the cell to a neighboring cell , say cell k, with probability r_{ju},ku>0 is possible only when j and k are neighboring cells . refer to [2] for a similar protocol. It is worthy to point out that the specific values of the probability r_{ju},ku for different system will depend on the signal to noise ratio at cell j and cell k for class u calls.

(7) A class u handoff call to cell bj is admitted for connection when it arrives and finds at least b_{ju} channels available and the constraint in item 2 above is not violated after admitting this class u handoff call. Otherwise, the handoff call will be cleared from the network with probability r_{ju}, 0 or will be admitted in cell j by

the system in terms of pushing out a class u call to a cell k with probability r_{ju}, ku.

Note that the protocol above gives priority to handoff calls as well as fairness for each class of calls. The key differentiation of the priority comes in form the therehold value T_{ju} and the main differentiation of the fairness comes from the reservation number K_{ju}. The use of probability r_{ju}, ku can model several network features. (1) if a call is blocked at one cell, it may not be blocked by the network.

This is possible in practice, because cells often overlap to ensure complete coverage of the region and when a call is attempted, the mobile may be situated near the boundaries of two cells and it may be close to a third or fourth cell. A handoff attempt is possible to these neighboring cells when the first attempt is blocked. The protocol is called directed retry in [13]. (2) if a call arrives to a cell and finds all channels busy, it is possible to borrow a channel does not interfere with the existing calls. This is called simple borrowing strategy in [13]. Some related borrowing concepts can be found in the hybrid channel assignment strategy [7]. In this paper we consider the case that r_{ju},ku= r_{ju}, p_{ju},ku/(b_{ju} + r_{ju}), thus $P(R_{ju} < H_{ju})P_{ju}$,$ku_{ju} \equiv r_{ju}$,ku. An intuitive explanation for this assumption is that a pushed out class u call to a cell follows the same protocol as those class u calls at cell j that move out of the cell before finishing the call. We remark that the production form solution presented in this paper fails if r does not take this form.

Example: Suppose there are three classes of calls in a cell and the capacity in the cell is 15,30,45,60………the minimum and maximum numbers of channels needed by the three classes of calls are both 1,2,3,4……..and 2,4,6,8……….that is, $b_1 = b_2 = b_3$……=1,2,3…………and $B_1 = B_2 = B_3$……….=2,4,6………... where for simplicity we have dropped the cell index. This state space for this cell is

$2n_1+2n_2 \le 15$.

$2n_1+2n_2+2n_3 \le 30$.

$2n_1+2n_2+2n_3+2n_4 \le 45$.

$2n_1+2n_2+2n_3+2n_4+2n_5 \le 60$.

Suppose at a call arrival epoch, or a call completion epoch, or a call handoff epoch, the new state is (1, 3, 4), which is a feasible state from equation (6). From equation (1) it is easily seen that $a_{ju}(n_{ju})=1$. Based on this result and form equation (2) and (3), it is ready to drive that $u_j^*(n_{ju})=2$. Finally from equation (4), we can figure out that $m_j^*(n_{ju})=1$.

Therefore based on our channel sharing algorithm, we obtain the following channel allocation for state (2, 3, 4…):

Assign 4 channel to each of the 2 class 1 calls,
Assign 4 channels to each of the 3 class 2 calls,
Assign 3 channels to each of the other 2 class 2 calls,
Assign 3 channels to each of the 4 class 3 calls.

Similarly for nth time.

Multibeam Access Point:

(A) Antenna System for CAC: two types of Multibeam smart systems. One is based on adaptive arrays and the other is based on the fixed beam directional antennas. in present study, we consider fixed multi beam antenna system.

Let antenna system consist of M sectors, each of which is oriented to provide non overlapping 360/M azimuth coverage. Each sector consists of N narrow beams with approximately 360/MN beam width per beam where the bandwidth of two edge beams of each section may be a little bit larger for better coverage. In a Multimedia Mobile Network (MMMN) system, CAC is used to accept or reject connection request based on the state information which defined as 360/MN. And we define a CAC policy in the following: let B the overall beam width resource (for subscribes k, B=DBk) and let M' be the number of traffic classes, then we can then define the system state vector as n= n (n_1, n2, n3,……….n_m) of class I connection in the system. Assuming that the beam with requirement of classes I connection is fixed to bi, then beam width requirement vector is represented by b= (b_1, b_2,…………..b_m). Therefore an incoming will be accepted if sufficient beam width resources are available.

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