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A Review on Algorithm of Admission Control of Call in Cellular Networks

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Abstract: The major use of wireless network systems is the ability to offer end user wireless services. In this paper, many call admission control schemes have been proposed. Call admission control schemes play more important role in QOS of wireless cellular networks. They achieve some desired quality of service parameters. The design of call admission control algorithms is challenging with the limited and variable resources, and the mobility of users in such networks. This paper includes a survey of call admission control schemes for cellular networks and the research in this area. The goal is to provide a broad classification of existing call admission control schemes. We describe several admission control schemes.

Keywords: Call Admission Control (CAC), Dynamic Channel Allocation (DCA), Handoff, Quality of Service, Radio Resource Management, User Mobility.

I. INTRODUCTION

Third generation radio communication systems are designed to offer multimedia services, including voice and video telephony and high-speed Internet access. The mobile communications area is one of the most important technological areas. Technological advances and developments in the mobile communications area have been driven by multiple factors including the successful interconnection of existing networks [1] [6]. The network operators want to provide best quality of service to the users connected to their networks and, also, increase the number of customers. The interconnection of existing networks can give an important contribution to this task. In this context, new radio resource management strategies are required.

II. FIRST CAC ALGORITHM

Here, the authors proposed a threshold-based algorithm. Proposed RRM was applicable to an environment with two layers: microcell and macrocell, as depicted in system architecture (Fig. 1). In Fig. 1, the number of radio channels in microcell and macrocell are Cm and CM, respectively. Besides, the macrocell has a threshold K, whose role is to aid in the decision about turning on/off a BS. Moreover, two modules can be highlighted, namely, the Load Control (LC) and the DCM modules. The role of the LC module is to periodically monitor the macrocell and microcell radio occupancies and transmit them to the DCM module. With that information in hand, proposed DCM algorithm can decide when the microcell can be turned off/on. The calculation of the system performance by developing a new LTE mechanism for allocating resources in the downlink based on call admission control (CAC) taking into account mobility within and between cellular users is given [2]. This mechanism uses adaptive modulation and coding (AMC) that divided the geographical area into several concentric regions. With this mechanism each call accepted by the system maintains its initial throughput regardless of the position of the user in the cell. JRRM scheme achieves a good balance between energy-efficient network design and system performance by properly setting up the value of the threshold.

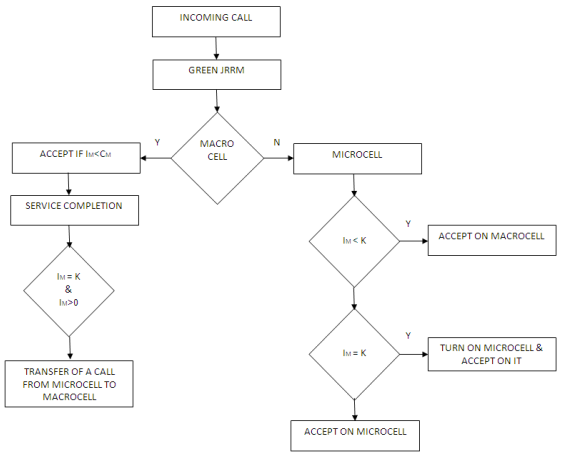

Fig.1. Joint Radio Resource Management

III. SECOND CAC ALGORITHM

Based on the type of service requested by the user (RT or BE) and mobility, the approach to resource allocation divides the coverage area of a base station eNodeB in different regions. Each calls belonging to a given class of service, and receives the same bit rate [3]. The system will assign a number of subcarriers depending on the location

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of the call. A call will be blocked if the allocation becomes impossible because of lack of resource. If the call does not complete its service in a given area, then it will move to another region based on the direction of mobility and subsequently change the modulation.

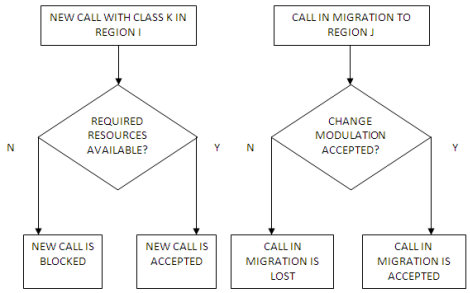

Fig.2. Radio Resource Management Based on RT calls

IV. THIRD CAC ALGORITHM

This mechanism is applicable only for a new call of type real-time (RT). RT calls have the same bit rate. A RT call receives a number of subcarriers according to its modulation efficiency. RT calls will be accepted until over flow [3].

Non real time calls (NRT) (BE) receives the same number of subcarriers, they use fairly subcarriers remained by the (RT) calls according to the Processor Sharing. The duration of the RT call is independent of the resources consumed, and depends only on user behavior. BE calls complete the service for a larger number of subcarriers.

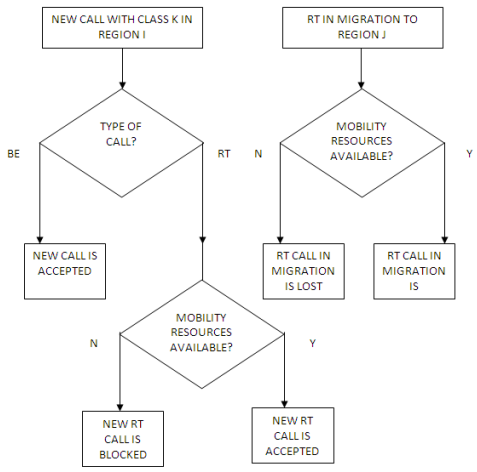

Fig.3. Radio Resource Management Based on Mobility

V. FOURTH CAC ALGORITHM

A novel CAC algorithm that guarantees QoS, that is, forced termination probability for profiled users at any load is proposed. From the network operator's view, the algorithm can maintain a very high successful call completion rate. The proposed CAC algorithm can work independently or in conjunction with other handoff prioritization schemes.

The algorithm can maintain any desired level of QoS, while the successful call completion rate is very high. In the proposed algorithm, the new call arrival rate is estimated continuously, and when the estimated arrival rate is higher than a predetermined level, some new calls are blocked irrespective of the availability of channels [4]. The reason behind this new call pre blocking is to maintain cell's observed new call arrival rate at no more than the predetermined rate.

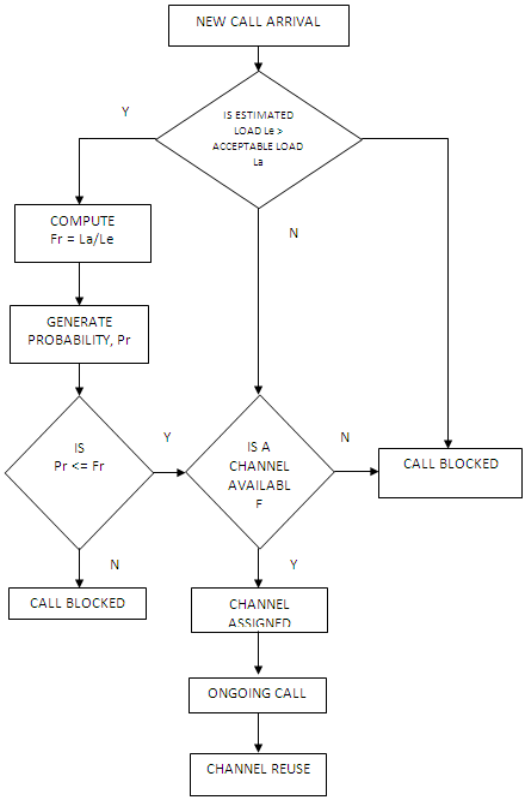

Fig.4. Radio Resource Management Based on Load

VI. FIFTH CAC ALGORITHM

Dynamic channel allocation strategies is for supporting data and video viewing or video conference with Quality of Service (QoS) by using the parameters such as call handoff probability and call blocking probability. In this Dynamic Channel Allocation is used to avoid traffic modelling for Audio or videoconferences [5]. Call Admission Control (CAC) mechanism which makes decisions on the possible acceptance of a video call into the network is not only based on the fulfilment of user's bandwidth prediction, but also it based on the revenue that the provider will make when degrading current users in order to accommodate new ones. Provide high Quality of Service (QoS) to wireless Audio or video conference users.

Call admission control algorithm enables to control the audio and video quality of calls over a Cellular -area link by limiting the number of calls that are allowed on that link at same time it allows for traffic check if it be dynamic allocation. Audio and video quality can begin to degrade when too many active calls exist on a link and the amount of bandwidth is oversubscribed. By using Dynamic channel allocation admission control regulates

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audio and video quality by limiting the number of calls that can be active on a particular link at the same time for priority scheduling it checks level of audio or video quality on the link for a particular channel. In order allocate the different type of user such as audio and video which should be executes in priority checking. This check will performs priority for handoff calls and new calls for both existing users and new user.

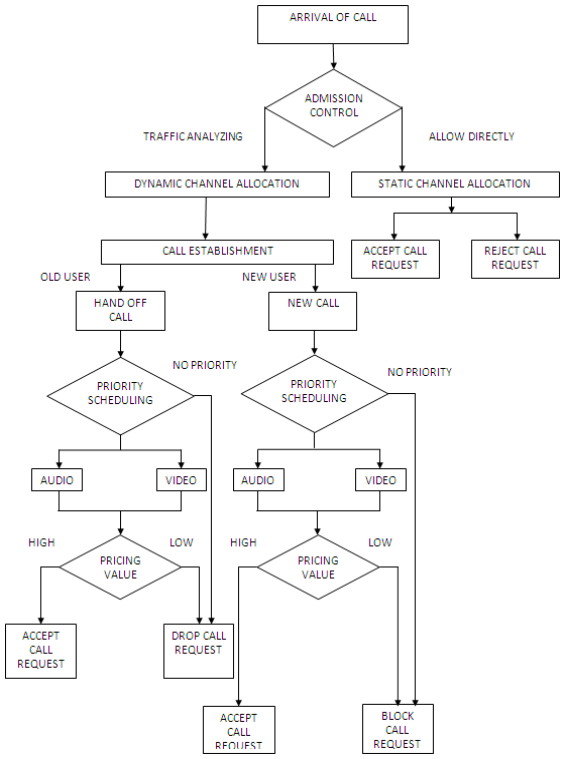

Fig.5. Radio Resource Management Based on DC

VII. CONCLUSION

The task of ensuring the admission of more user calls in the midst of scarce radio resources is a challenging one in a wireless network. For better resource utilization, the admission strategy adopted should ensure that the quality of ongoing calls is not affected or degraded. Adopting a certain CAC scheme to solve complex task requires to consider the nature of traffic and the cell environment. With the growing interest in data and multimedia services, single-class CAC schemes are no longer sufficient but, multiple-classes of service CAC schemes are more relevant, especially in 3G and beyond networks.

Ideally, in emerging cellular network, improving QoS provided to users for more revenue generation by operators requires adopting a CAC scheme which takes into consideration the influence of traffic from existing cell and neighbouring cells. In conclusion, when multimedia, heterogeneous traffic are involved in a multi-cell environment, as is the case in beyond 3G mobile networks, the interference, power, threshold based and collaborative, utility-function and computational-intelligence based schemes can be adopted for use. These schemes ensure optimal utilization of cellular network resources by handling multiple cell requests simultaneously thereby increasing total system capacity with reduced programming difficulties.

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