A study of Call admission Control to Optimize the performance for wireless Cellular Communication Networks

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Abstract: We study to call admission control system through wireless cellular communication networks. A Call admission control is a key element in the provision of guaranteed quality of service in wireless networks. Call admission control is a technique to provide the quality of service in a communication network by restricting the access to other network resources. Simply we stated that an admission control system to accept a new call request provided there are adequate free resources to meet the quality of services requirement of the new call request without violating the committed quality of service of already accepted calls. The design of all admission control algorithms for mobile cellular networks is especially challenging given the limited and highly variable resources and the mobility of users encountered in such networks. This paper provides a study of admission control mechanism for cellular networks and also describes comparisons between call admission control mechanisms.
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Introduction:

Wireless communication networks have been expected fully utilization of network resources while retaining satisfactory quality of service for each user. In less than two centuries communication networks have significantly reshaped the infrastructure of our society. Nowadays we live in a connected world with wireless networks virtually everywhere. To meet today's continuously growing demand for wireless access, even more advanced techniques need to be developed. The purpose of this introduction is to give a brief overview of wireless cellular communication networks and to describe how the problems in the appended papers arise and relate to known results. A wireless network is typically organized into geographical regions called cells2. The mobile user in a cell is served by a Base Station. The future telecommunications networks (such as the third-generation wireless networks) aim to provide integrated services such as voice, data, and multimedia via inexpensive low-powered mobile computing devices over wireless infrastructures. As the demand for multimedia services over the air has been steadily increasing over the last few years, wireless multimedia networks have been a very active research area. To support various integrated services with a certain quality of service requirement in these wireless networks, resource provisioning is a major issue [3], [4]. Call admission control (CAC) is such a provisioning strategy to limit the number of call connections into the networks in order to reduce the network congestion and call dropping. In wireless networks, another dimension is added: call connection (or simply call) dropping is possible due to the users' mobility. A good CAC scheme has to balance the call blocking and call dropping in order to provide the desired QoS requirements [1], [2], [5], [6]. The mobile communication networks are evolving into adaptable Internet protocol based networks that can handle multimedia applications. When the multimedia data is supported by wireless networks, the networks should meet the quality of service requirements. One of the key challenges to be addressed in this prevailing scenario is the distribution of the available channel capacity among the set of multiple users; those are operating with different bandwidth requirements ensuring the Quality of services requirements of the traffic.

Problem statement:

The overall goal is to optimize the performance in a wireless communication network. In this optimization means that we want to send with data rates in such a manner that it favors the overall system performance and its individual users. We want to study systems that are in accordance with current standards in the context of how much these systems theoretically can produce. This allows us to and the potential of the system in terms of what can be achieved. In future work this acquired knowledge can be used as a guideline when developing more advanced distributed solution methods than what we see in today's systems.

NEW CALL ADMISSION CONTROL SCHEME:

The main aim of the new call admission control algorithm is to reduce the load on the system while

reducing the dropping rates. In this algorithm, priority is given for handoff request, since handoff request is considered more important than new call request8. Let Plot be the total power of the existing users, Let Avail be the available total power. In this section, we will study three call admission control schemes in wireless networks when the channel holding times for new calls and handoff calls are differentiated: the new call bounding priority, the cutoff priority scheme, and the new call thinning scheme. The analytical techniques and results can be easily extended to blocking performance for wireless multimedia networks with multiple prioritized traffic, in which corresponding call admission control schemes can be obtained. We can immediately observe that the analytical results are valid for wireless networks with two prioritized traffic.

Let 1 and 1 denote the arrival rate for new calls, the arrival rate for handoff calls, the average channel holding time for new calls, and the average channel holding time for handoff calls, respectively. Let denote the total number of channels in a cell. We assume that the arrival process for new calls and the arrival process for handoff calls are all Poisson,

Algorithm Steps:

1) accept a new call request
2) if it is handoff call, then
if Ptot<Pavail
Admit the request
If Ptot>Pavail
Degrade the existing users, as per their specification.
If still, Ptot>pavail
If Ptot<Lmax, admit the request
Otherwise reject the request.

We apply the Service Degradation Descriptor (SDD) based on the degradation mechanism, in which user calls are degraded as per the SDD of the user requirement.

Traffic Characteristics:

To optimize the network resources, a research on the different traffic parameters (requirements) quality of service need will be done. The proposed research includes examining existing CAC applications that could be efficiently implemented; as well as measuring network and computing properties to determine the performance of the proposed scheme. A traffic model is going to be developed. [7,8] are useful models for this research. The work in this project will involve calculating the new call and handoff call blocking probabilities.

CONCLUSION:

In this paper, we have proposed a optimize of performance model for call admission control framework In order to measure the call blocking probability of the analytical model the simulation study was conducted and following observations were recorded. Firstly, increase in the number of type 1 users will increase the call blocking probability of type2 and type 3 calls and vice versa. Second, Increase in the traffic intensity of one type of traffic will increase the system blocking probability. In this technology we can perform the optimize technology of call admission by wireless cellular communication technology networks.

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