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FRACTAL TRAFFIC MANAGEMENT IN WIRELESS NETWORK

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ABSTRACT

Communication is significant way to move the data from one place to other place which is geographically located far away from each other. In early days telegraphy technique was used to send the information from place to other place with the help of wires. Telegraphy is very time consuming and non reliable method of data transmission. To overcome such type of problems engineers developed a new communication technology which is known as mobile communication. Mobile communication fulfils almost all the requirements of growing market and modern world. All business sectors are using mobile communication for data transmission. The new problem of fractal traffic is arrived because of limited channels and increase in fractal traffic to solve this problem traditional method is to improve the data transmission mechanism and quality of service.

KEYWORDS -Call admission control, fractal traffic, and network.

INTRODUCTION

FRACTAL TRAFFIC CONTROL

Fractal traffic control is a sensitive factor in mobile network because the call handling capacity of network decides the quality of service. The network should serve the maximum incoming calls and block minimum incoming calls. Network conjunction is another important factor on which the quality of service is depends. The improvement in call admission control scheme is done by adopting the new algorithms to reduce call blocking of incoming calls [1], [4], [13],[14].The geographical position of user is static than the communication is not complex. If the user is continuously changing its geographical location than call transfer process become more complex.

The detail analysis of call admission control method is to be done to overcome these limitations. Call admission control schemes are used for this [11]. Channels in the network are limited and divided into different sections. Some channels are allotted for incoming calls, some channels are allotted for ongoing calls and some are allotted for handoff calls.

HAND OFF TRAFFIC

Channels are divided into different section so there is limitation to handle the amount of incoming call and amount of hand off call. On first come first serve basis this CAC process can be executed up to some extant but the maximum efficiency of network is not utilized [15]. While giving service to incoming call another important parameter is channel holding time. If the calls hold the channel for long time the blocking of call is increases [5]. [6] and QoS is degraded.

NEW CALL TRAFFIC

The distribution of channels over a network is divided into

1. Channels for new incoming calls
2. Channels for ongoing calls
3. Channels for handoff calls

The channels allotted for the handoff calls are exponentially same as new incoming calls [5], [6].The following parameters is responsible for call holding time

- Call blocking probability
- Channel holding time

Subscriber is changing its location from on cellular location to different cellular location the ongoing call will be hand off to another cell but acceptance of handoff call into another network will be depend upon no off free channels available and signal strength [15].
If the handoff channels are free and signal strength is good the handoff call will be handover to next new cell
The allotments of number of channels are decided by using number of scheme and algorithms depending on network.

HANDOFF CALLS ACCEPTANCE

To reduce the call blocking probability of new incoming calls is reduced by using new call admission control scheme [9].This scheme gives the solution for blocking of new incoming calls in the network and reduces the channel holding during handoff processes, improves rating of communication system. In cellular network the concept of frequency reuse is used and for moving user the cell selection is very critical job. The cell structure is hexagonal the cell radius is an important parameter who play important role in cell selection.
Cells are spade horizontally and vertically in the network the problem of proper selection of network is solved by means of vertical handoff. The approximate handoff latency is 600ms in traditional network if the time of latency is increase the quality of service will be Decrease
This latency can be reduced up to 200ms by using vertical handoff technique
It is used in small shopping malls, school campus, or a housing society.

TRADITIONAL METHOD

In traditional method the channel allotment for number of fresh calls and number of handoff calls are having fixed threshold value. If a fresh call is arrived and the threshold value for fresh call is crossed than that call will not be accepted otherwise the call will be accepted.
Same algorithm is used for handoff processes when request come for handoff and the threshold value of handoff channel is crossed then that call will be rejected otherwise that call will be accepted.

Let λ -- Incoming rate of fresh calls.

λ_h -- Incoming frequency of handoff calls

$1/\mu$ -- Average channel hold time duration by fresh calls.

$1/\mu_h$ -- Average channel hold time duration by handoff call.

m -- Cutoff threshold (Determined on the basis of on-going calls)

$$P_{nb}^{a} = \frac{\sum_{j=m}^{F} \frac{(\rho+\rho_h)^m \rho_h^{j-m}}{j!}}{\sum_{j=0}^{m} \frac{(\rho+\rho_h)^j}{j!} + \sum_{j=m+1}^{c} \frac{(\rho+\rho_h)^m \rho_h^{j-m}}{j!}}$$

$$P_{hb}^{a} = \frac{\frac{(\rho+\rho_h)^m \rho_h^{C-m}}{C!}}{\sum_{j=0}^{m} \frac{(\rho+\rho_h)^j}{j!} + \sum_{j=m+1}^{c} \frac{(\rho+\rho_h)^m \rho_h^{j-m}}{j!}}$$

The amount of busy channel is not greater than m, and then fresh call will admitted. For simulation model two dimensional markov chains is considered.
The equation for fresh call blocking probability and handoff call blocking probability is
These equations are used to estimate call blocking probability for the Traditional method. By using above equations the call blocking probabilities is approximated for Traditional method.

SIMULATION MODEL

The simulation model and assumptions, which is used in section 4.1, same model is used with some changes to analyze this method .The acceptance or rejection of new calls are not depend

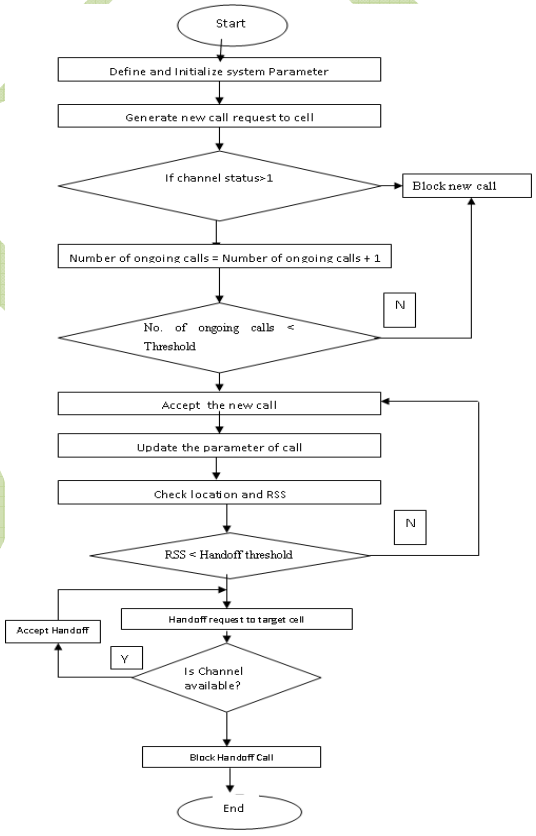

Figure 1: Flow chart for Traditional method for wireless network

On the value assign for new admission of calls, but it is depend upon the total number of current ongoing calls.

CONCLUSION

In traditional method is analyzed and simulated for wireless network. In this method, to admit a fresh call the number of free channels should be below the threshold value than only the call will accepted otherwise it will rejected.
The traffic is varied in steps of 5 Erlangs per cell. (The erlang as a dimensionless unit is used in telephony as a statistical measure of the volume of telecommunications traffic) From result it is observed

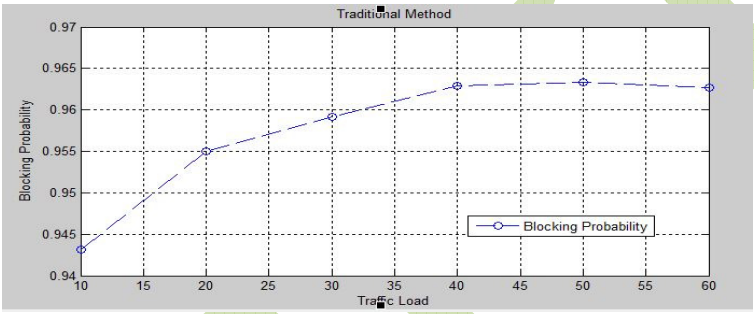

Figure 2: Simulation Result of Traditional Method

Fresh call blocking is increase as per the increase in fractal traffic and it is decrese when the fractal traffic is decreases.
Up to 35 erlangs handoff blocking is increases up to 50% after that it will remains almost stable.

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