An Optimal Prioritized Channel Assignment Scheme for Using in Mobile Transaction Environments

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Abstract

In this paper, we introduce a two threshold guard channel scheme, which maintains predefined upper bounds on the dropping probabilities of both handoff transaction and handoff voice calls in mobile transaction environments. The proposed call admission scheme minimizes the blocking probability of both types of new calls subject to the hard constraint on the dropping probabilities of handoff transaction calls and handoff voice calls. The limiting behavior of the proposed scheme policy is analyzed under the stationary traffic. In this paper, we also introduce an algorithm, which minimizes the channel requirement of a cell subject to the all hard constraints on the quality of service of calls. The two-threshold guard channel scheme can easily be extended to multi-classes traffics.

1. Introduction

Recent advances in technology enable portable computers to be equipped with wireless interface which allows network communication even while mobile. Whereas today's networked computers and personal digital assistances (PDAs) are self-contained, tomorrow's networked mobile computers and are part of a greater computing infrastructure. Mobile computing constitutes a new paradigm of computing that is expected to revolutionize the way that computers are used. A general mobile computing system, shown in figure 1, consists of a set of mobile computers and a set of fixed computers. Fixed computers are either fixed hosts or base stations. Fixed hosts are information servers with associated databases and are connected to the existing wired line network. The fixed computers communicate with each other through a fixed wired-line network and the mobile computers, henceforth referred to as *mobile hosts* (MH), communicate with other computers in the network, fixed or mobile, by employing wireless communication. In order to support wireless communication for mobile hosts, geographical area covered by mobile network is divided into smaller regions called *cells*. Each cell has a fixed server computer, referred to as the *mobile service station* (MSS) or *base station* (BS), which is located at its center. A number of base stations are connected to a fixed computer called *mobile switching center* (MSC) which also acts as a gateway of the mobile network to the existing wired-line networks like PSTN, ISDN, or any LAN-WAN based networks or even internet. The mobile service stations are connected to the wired-line network and communicate with mobile hosts through wireless links and with mobile switching centers through wired-line links. A mobile host can have wireless communication with any other computer in the network, fixed or mobile, only through the base station of its cell.

In a typical mobile computing system, mobile users access the data bases located on the information servers by submitting transactions. These transactions, which are called *mobile transactions*, are submitted from mobile hosts, which are sent to the base station by using wireless connections and then sent to the information servers via the existing wired network. During execution time of a transaction, user may be participated to enter some data which are needed by the transaction. Since cost of a call setup is very expensive,

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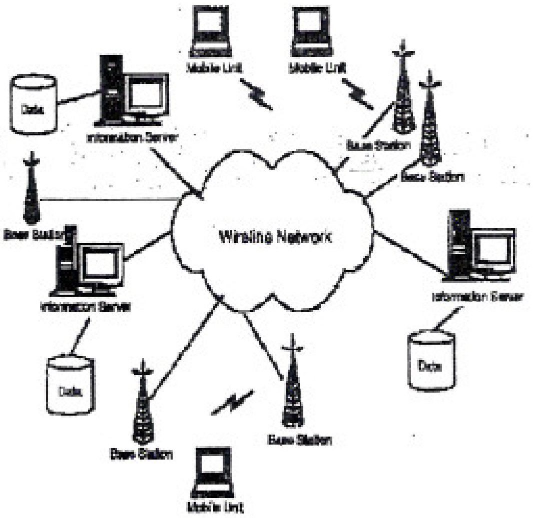

Fig. 1. Model of general mobile computing system.

it is assumed that during this period the communication link is kept. During the execution time of a mobile transaction, a mobile host may move from one cell to another cell. When the mobile host enters a new cell, the base station of new cell should provide an idle channel to the mobile host to continue its communication. This process is called handoff and must be transparent to the mobile user. If there is no idle channel in the new cell, then the connection will be dropped. The dropping of an active transaction is undesirable to the mobile user and also wastes the system resources, because the database should be rolled back and the transaction will be started later. The dropping probability of handoff calls and the blocking probability of new calls are two important quality of service (QoS) measures of the cellular networks. In order to have control on the dropping probability of handoff calls, call admission policies are introduced. The *call admission policies* determine whether a call should be admitted or blocked. Both blocking probability of new calls (B_n) and dropping probability of handoff calls (B_h) are affected by call admission policies. Blocking more new calls generally improves dropping probability of handoff calls and admitting more new calls generally improves blocking probability of new calls. Since dropping of handoff calls is more serious than blocking of new calls, call admission policies give the higher priority to handoff calls. This priority is usually implemented through allocation of more resources (channels) to handoff calls [1]. Many schemes have been proposed to reduce the dropping of voice calls [2, 3, 4, 5, 6]. However, little attention is paid to wireless multi-media networks and transaction calls. In what follows, we review some of reported call admission policies in the cellular networks.

The simplest call admission policy is called *guard channel* policy (GC) [2]. Suppose that the given cell has C full duplex channels. The guard channel policy reserves a subset of channels, called *guard channels*, allocated to the cell for sole use of handoff calls (say $C-T$ channels). Whenever the channel occupancy exceeds a certain threshold T, the guard channel policy rejects new calls until the channel occupancy goes below the threshold. The guard channel policy accepts handoff calls as long as channels are available. It has been shown that there is an optimal threshold T^* in which the blocking probability of new calls is minimized subject to the hard constraint on the dropping probability of handoff calls [4]. Algorithms for finding the optimal number of guard channels are given in [3, 4, 5]. If the B_h is considered, the guard channel policy gives very good performance, but the B_n is degraded to a great extent. In order to have more control on the dropping probability of handoff calls and the blocking probability of new calls, *limited fractional guard channel policy* (LFG) is introduced [4]. The LFG scheme reserves non-integral number of guard channels for handoff calls. The limited fractional guard channel policy uses an additional parameter π. This policy is same to the guard channel policy except when T channels are occupied in the cell. In such situations, the limited fractional guard channel policy accepts new calls with probability π. It has been shown that there is an optimal threshold T^* and an optimal value of π^* for which the blocking probability of new calls is minimized subject to the hard constraint on the dropping probability of handoff calls [4]. An algorithm for finding such optimal parameters is given in [4]. In [6], *uniform fractional guard channel policy* (UFG) is introduced which accepts new calls with probability of π independent of channel occupancy. It is shown that there is an optimal value for the parameter of uniform fractional guard channel which minimizes the blocking probability of new calls with the constraint on the upper bound on the dropping probability of handoff calls. An algorithm for finding such optimal parameter is given in [6]. Then conditions for which the uniform fractional guard channel policy performs better than guard channel policy is derived. It is concluded that, the uniform fractional guard channel policy performs better than guard channel policy in low handoff traffic conditions. All of the above mentioned algorithms are special case of *fractional guard channel policy* [4]. Some policies allow either handoff calls [7] or new calls

[8] to be queued until free channels are obtained in the cell. In [9, 10], a multi-media cellular network with two traffic classes are considered and call admission control is formulated as a semi-Markov decision process problem. Since, it is too complex to have a closed form solution for this semi-Markov decision process, Q-learning [9] and neuro-dynamic programming [10] are used. In [11], two traffic classes of voice and transactions are considered and static and dynamic guard channel schemes are proposed to maintain the upper bound of dropping probability of handoff transaction calls. In this approach, $(C-T)$ guard channels are reserved for handoff transaction calls, but new calls and handoff voice calls have the same priority. Thus, this scheme fails to maintain the upper bound for dropping probability of handoff voice calls.

All of the above mentioned call admission policies consider only one threshold to decide for accepting/rejecting new calls. These policies fail when different services needs different level of QoS. For example, consider the case where the dropping probability of handoff voice calls must be smaller than the blocking probability of new calls in the mobile transaction environments. In such cases, we need multi-threshold guard channel schemes, which provides different set of guard channels for different services. The only multi-threshold guard channel scheme, called *dual-threshold reservation* (DTR) scheme, is given in [12]. The basic idea behind the DTR scheme is to use two thresholds, one for reserving channels for voice handoff, while the other is used to block data traffic into the network in order to preserve the voice performance in terms of handoff dropping and call blocking probabilities. DTR assumes that the bandwidth requirement of voice and data are the same. The blocking probabilities of DTR are calculated using a two-dimensional Markov chain and the effect of different values for number of guard channels on dropping and blocking probabilities are shown by graphs, but no algorithm is given to find the optimal number of guard channels.

In this paper, a two threshold guard channel scheme is introduced. The proposed scheme maintains predefined upper bounds on the dropping probabilities of both handoff transaction and handoff voice calls. The proposed call admission scheme minimizes the blocking probability of both types of new calls subject to the hard constraint on the dropping probabilities of handoff transaction calls and handoff voice calls. In the proposed scheme, channels allocated to the given cell is partitioned into three subsets: ordinary channels, shared guard channels for handoff calls and dedicated guard channels for handoff transaction calls. The ordinary channels are shared between all types of calls while the shared guard channels for handoff calls are shared only between handoff transaction calls and handoff voice calls and dedicated guard channels for handoff transaction calls is used only for the handoff transaction calls. The proposed call admission policy can easily be extended to multi-classes traffics. The limiting behavior of the two-threshold is analyzed under stationary traffics. In this paper, we also introduce an optimal algorithm, which minimizes number of channels required for a cell while satisfying hard constraints on the blocking probability of new calls and the dropping probabilities of voice and handoff transaction calls. In order to show the feasibility of the proposed scheme, computer simulations are conducted. The simulation results also confirm the analytical results.

The rest of this paper is organized as: Section 2. presents the performance parameters of two-threshold guard policy. Section 3. gives an optimal algorithm to find the minimum number of channels and optimal number of guard channels of the proposed scheme and section 4. concludes the paper.

2. Two-Threshold Guard Channel Scheme

In this section, we first introduce two-threshold guard channel scheme and then compute its blocking probabilities of such scheme. The blocking performance of two-threshold guard channel policy is computed based on the following assumptions. of two-threshold guard channel policy is computed based on the following assumptions.

1. There are two types of calls in the network: voice and transaction calls. Every call requests only one channel. The new transaction calls have the same priority as the new voice calls but the handoff transaction calls have the higher priority than the handoff voice calls and handoff calls have higher priority than the new calls.
2. The arrival processes of new voice calls and new transaction calls are Poisson with rate λ_{nv} and λ_{nt}, respectively. The arrival processes of handoff voice calls and handoff transaction calls are Poisson with rate λ_{hv} and λ_{ht}, respectively. Let $\lambda = \lambda_{nv} + \lambda_{nt} + \lambda_{hv} + \lambda_{ht}$, $\lambda_h = \lambda_{hv} + \lambda_{ht}$, $\alpha = \lambda_h/\lambda$ and $\alpha_t = \lambda_{ht}/\lambda$. Note that α and α_t are the handoff voice and handoff transaction traffics in Erlangs seen by a cell.
3. The channel holding time of new voice, handoff voice, new transaction, and handoff transaction calls are exponentially distributed with mean μ_{nv}^{-1}, μ_{hv}^{-1}, μ_{nt}^{-1} and μ_{ht}^{-1}, respectively. Let $\mu^{-1} =$

$\mu_{nv}^{-1} + \mu_{hv}^{-1} + \mu_{nt}^{-1} + \mu_{ht}^{-1}$ and $\rho = \lambda/\mu$. Note that ρ is the total traffic in Erlangs seen by a cell.

4. The time interval between two calls from a mobile computer is much greater than the mean call holding time.
5. Only mobile to fixed calls are considered.
6. The network is homogenous.

The three assumptions 2 through 4 have been found to be reasonable as long as the number of mobile computers in a cell is much greater than the number of channels allocated to that cell. The fifth assumption makes our analysis easier and the sixth one lets us to examine the performance of a single network cell in isolation.

Suppose that the given cell has a limited number of full duplex channels, C, in its channel pool. We define the state of a particular cell at time t to be the number of busy channels in that cell, which is represented by $c(t)$. Assume that the quality of service (QoS) for handoff transaction calls is greater than the QoS for other calls and the QoS for handoff voice calls is greater than the QoS for new calls. In order to maintain such level of QoS, channels allocated to the given cell are partitioned into three subsets: *ordinary channels, shared guard channels for handoff calls* and *dedicated guard channels for handoff transaction calls*. The ordinary channels are shared between all types of calls while the shared guard channels for handoff calls are shared only between handoff transaction calls and handoff voice calls and dedicated guard channels for handoff transaction calls is used only for the handoff transaction calls. In order to partition the channel sets, two thresholds, T_1 and T_2 $(0 < T_1 \leq T_2 \leq C)$ are used. By using these two thresholds, handoff calls have larger priority than the new calls and between the handoff calls, the handoff transaction calls have larger priority than the handoff voice calls. The procedure for accepting calls in two-threshold guard channel policy, as shown in figure 2, can be described as follows. When a handoff transaction call arrives and an idle channel is available in the channel pool, the call is accepted and a channel assigned to it; otherwise the handoff transaction call will be dropped. When a handoff voice call arrives, it is accepted provided that number of busy channels is smaller than T_2; otherwise the handoff voice call is dropped. When a new voice or transaction call arrives at cell, it is accepted provided that the number of busy channels is smaller than T_1 $(T_1 \leq T_2)$; otherwise, the incoming call will be blocked.

In the above procedure, the highest priority is given to the handoff transaction calls and the lowest priority is given to the new calls. In the two-threshold

```
if (NEW CALL) then
    if (c(t) ≤ T1 ) then
        accept call
    else
        reject call
    end if
end if

if (HANDOFF VOICE CALL) then
    if (c(t) ≤ T2 ) then
        accept call
    else
        reject call
    end if
end if

if (HANDOFF TRANSACTION CALL) then
    if (c(t) < C ) then
        accept call
    else
        reject call
    end if
end if
```

Fig. 2. Two-threshold guard channel call admission

guard channel policy, $\{c(t)|t \geq 0\}$ is a continuous-time Markov chain (birth-death process) with states $0, 1, \ldots, C$. The state transition diagram of a particular cell in the network, which has C full duplex channels and uses two-threshold guard channel policy is shown in figure 3.

Fig. 3. Markov chain model of cell

It is apparent that the state dependent arrival rate in the birth-death process, is equal to

$$\lambda(n) = \begin{cases} \lambda & n \leq T_1 \\ \lambda_h & T_1 < n \leq T_2 \\ \lambda_{ht} & T_2 < n \leq C. \end{cases} \quad (1)$$

Because of the structure of the Markov chain, we can easily write down the solution to the steady-state balance equations. Define the steady state probability

$$P_n = \lim_{t \to \infty} \text{Prob}[c(t) = n] \qquad n = 0, 1, \ldots, C. \quad (2)$$

By writing down the equilibrium equations for the steady-state probabilities P_n $(n = 0, 1, \ldots, C)$, we obtain

$$\lambda P_{n-1} = n\mu P_n \quad n \leq T_1.$$

$$\lambda_h P_{n-1} = n\mu P_n \quad T_1 < n \leq T_2.$$

$$\lambda_{ht} P_{n-1} = n\mu P_n \quad T_2 < n \leq C.$$

Then, we have the following expression for P_n ($n = 0, 1, \ldots, C$).

$$P_n = \begin{cases} \frac{\rho^n}{n!} P_0 & n \leq T_1 \\ \alpha^{-T_1} \frac{(\rho\alpha)^n}{n!} P_0 & T_1 < n \leq T_2 \\ \alpha^{-T_1} \left(\frac{\alpha}{\alpha_t}\right)^{T_2} \frac{(\rho\alpha_t)^n}{n!} P_0 & T_2 < n \leq C, \end{cases} \tag{3}$$

where P_0 is the probability that all channels are free and obtained from equation $\sum_{n=0}^{C} P_n = 1$. Thus, P_0 is equal to the following expression.

$$P_0^{-1} = \sum_{n=0}^{T_1} \frac{\rho^n}{n!} + \alpha^{-T_1} \sum_{n=T_1+1}^{T_2} \frac{(\rho\alpha)^n}{n!} + \alpha^{-T_1} \left(\frac{\alpha}{\alpha_t}\right)^{T_2} \sum_{n=T_2+1}^{C} \frac{(\rho\alpha_t)^n}{n!}. \tag{4}$$

Note that if we set $T_1 = T_2 = C$, then expression (3) reduces to the classical Erlang-B formula [13] and if we set $T_1 = T_2 = T$, then expression (3) reduces to the classical guard channel policy [2]. Now we can write expressions for the dropping probability of handoff calls. The dropping probability of handoff transaction calls using C channels, $C - T_2$ dedicated guard channels and $T_2 - T_1$ shared guard channels is equal to

$$B_{ht}(C, T_1, T_2) = P_C. = \alpha^{-T_1} \left(\frac{\alpha}{\alpha_t}\right)^{T_2} \frac{(\rho\alpha_t)^C}{C!} P_0. \tag{5}$$

and the dropping probability of handoff voice calls is equal to

$$B_{hv}(C, T_1, T_2) = \sum_{n=T_2+1}^{C} P_n = \alpha^{-T_1} \left(\frac{\alpha}{\alpha_t}\right)^{T_2} \sum_{n=T_2+1}^{C} \frac{(\rho\alpha_t)^n}{n!} P_0. \tag{6}$$

Similarly, the blocking probability of new calls is given by the following expression.

$$B_n(C, T) = \sum_{n=T_1+1}^{C} P_n. = \alpha^{-T_1} \sum_{n=T_1+1}^{T_2} \frac{(\rho\alpha)^n}{n!} P_0 + \alpha^{-T_1} \left(\frac{\alpha}{\alpha_t}\right)^{T_2} \sum_{n=T_2+1}^{C} \frac{(\rho\alpha_t)^n}{n!} P_0. \tag{7}$$

$B_{ht}(C, T_1, T_2)$, $B_{hv}(C, T_1, T_2)$ and $B_n(C, T_1, T_2)$ have interesting properties, which are utilized in our prioritized channel assignment scheme. In this section, we study some important properties of $B_{ht}(C, T_1, T_2)$, $B_{hv}(C, T_1, T_2)$ and $B_n(C, T_1, T_2)$. From equations (5) trough (7), it is clear that the blocking probability of new calls is not smaller than the dropping probability of handoff voice calls and the dropping probability of handoff voice calls is not smaller than the drooping probability of handoff transaction calls. That is,

Property 1. For any given values of $0 < T_1 \leq T_2 \leq C$, the following relations are held.

$$B_{ht}(C, T_1, T_2) \leq B_{hv}(C, T_1, T_2) \leq B_n(C, T_1, T_2)$$

Property 2. For the blocking probability of new calls, $B_n(C, T_1, T_2)$, the following relations hold, assuming that all other system parameters are fixed.

1. B_n is a monotonically decreasing function of T_1.
2. B_n is a monotonically increasing function of T_2.
3. B_n is a monotonically increasing function of C.

Property 3. For the dropping probability of handoff voice calls, $B_{hv}(C, T_1, T_2)$, the following relations hold, assuming that all other system parameters are fixed.

1. B_{hv} is a monotonically increasing function of T_1.
2. B_{hv} is a monotonically decreasing function of T_2.
3. B_{hv} is a monotonically increasing function of C.

Property 4. For the dropping probability of handoff transaction calls, $B_{ht}(C, T_1, T_2)$, the following relations hold, assuming that all other system parameters are fixed.

1. B_{ht} is a monotonically increasing function of T_1.
2. B_{ht} is a monotonically increasing function of T_2.
3. B_{ht} is a monotonically decreasing function of C if $\rho < C$.

Proof. The proof of above properties are given in [14].

3. Minimizing Number of Channels with Hard Constraints

In this section, we consider the problem of finding a call admission policy that minimizes the number of channels while satisfying the hard constraints on the blocking probability of new calls and dropping probability for both handoff calls. Thus, we have the following nonlinear optimization problem.

Problem 1. Minimize C and find the pair (T_1, T_2) such that

$$B_n(C, T_1, T_2) \leq p_n$$
$$B_{hv}(C, T_1, T_2) \leq p_{hv}$$
$$B_{ht}(C, T_1, T_2) \leq p_{ht}$$

with constraints $0 < T_1 \leq T_2 \leq C$ and $p_n \geq p_{hv} \geq p_{ht}$.

The values of p_{hv} and p_{ht} are specified by the quality of service of the network. Since, cellular networks usually provides the same level of quality of service as that the public switched telephone networks(PSTN), p_{hv} is set equal to the quality of service of PSTN, which may range from one percent to five percent and two percent being the most common used values. Algorithm shown in figure 4 solves the problem 1 and finds triple (C, T_1, T_2) with minimum number of channels which assures the pre-specified QoS level of calls.

Theorem 1. *Algorithm shown in figure 4 minimizes number of channels used by the cell and also finds pair of (T_1, T_2), while satisfying the constraints on the blocking probability of new calls ($B_n(C, T_1, T_2) \leq p_n$), the dropping probability of handoff voice calls ($B_{hv}(C, T_1, T_2) \leq p_{hv}$) and the dropping probability of handoff transaction calls ($B_{ht}(C, T_1, T_2) \leq p_{ht}$).*

Proof. In order to prove the optimality of the given algorithm, from properties 2 through 4, it is sufficient to prove that the algorithm finds minimum value of C and maximum values of T_1 and T_2. The initial assignment obtained by while-loop 2 is an undominated solution, in the sense that it uses the minimum number of channels to satisfy the constraints defined by problem 1. This assignment results the minimum value of C subject to the given constraints, because it assigns the channels to the given cell one by one and also finds T_1 and T_2. Since the initial assignment may not maximize T_1 and T_2, then it is not necessarily the optimal solution. In order to find the maximum values of T_1 and T_2, while-loops 13 and 15 maximizes them. Hence, the given algorithm minimizes C and maximizes T_1 and T_2 subject to the hard constraints defined by problem 1, which results in the optimal solution.

Algorithm $MIN-CHANNELS-2$

1. **set** $C = T_2 = T_1 \leftarrow 0$
2. **while** $(B_n(C, T_1, T_2) > p_n$ **or** $B_{hv}(C, T_1, T_2) \leq p_{hv})$ **or** $B_{ht}(C, T_1, T_2) > p_{ht})$ **do**
3.   **if** $B_{ht}(C, T_1, T_2) > p_{ht}$ **then**
4.   **set** $C \leftarrow C + 1$
5.   **else if** $B_{hv}(C, T_1, T_2) > p_{hv}$ **then**
6.   **set** $T_2 \leftarrow T_2 + 1$
7.   **else**
8.   **set** $T_1 \leftarrow T_1 + 1$
9.   **end if**
10. **end while**
11. **while** $(B_n(C, T_1, T_2 + 1) \leq p_n$ **and** $B_{hv}(C, T_1, T_2 + 1) \leq p_{hv})$ **and** $B_{ht}(C, T_1, T_2 + 1) \leq p_{ht})$ **do**
12.   **set** $T_2 \leftarrow T_2 + 1$
13. **end while**
14. **while** $(B_n(C, T_1 + 1, T_2) \leq p_n$ **and** $B_{hv}(C, T_1 + 1, T_2) \leq p_{hv})$ **and** $B_{ht}(C, T_1 + 1, T_2) \leq p_{ht})$ **do**
15.   **set** $T_1 \leftarrow T_1 + 1$
16. **end while**
17. **return** (C, T_1, T_2)

end Algorithm

Fig. 4. Algorithm for finding the minimum number of channels of two-threshold guard channel policy required by cell

Example 1. In table 1, the result of the algorithm for determination of minimum number of channels is given. This example assumes that the blocking probability of new calls must be less than 0.05, the dropping probability of handoff voice calls must be less than 0.025 and the dropping probability of handoff transaction calls must be less than 0.01. The columns 2 through 4 of table 1 show the normalized arrival rate, probability that a call is being a handoff call, and probability that a call being a handoff transaction call, respectively. Columns 5 through 7 of table 1 show that the minimum number of channels and the optimal number of guard channels obtained by algorithm of figure 4. Columns 8 through 10 of show the blocking probabilities of calls. By carefully inspecting the table 4, it is evident that the proposed prioritized channel assignment scheme maintain all hard constraints on the blocking and dropping probabilities of calls.

4. Conclusions

In this paper, we considered the problem of call admission in the cellular mobile networks. We considered two

Table 1. Prioritized channel assignment by algorithm given in figure 4

Case	ρ	α	α_t	T_1	T_2	C	B_n	B_{hv}	B_{ht}
1	6	0.5	0.1	10	11	12	0.0122	0.0005	0.0005
2	9	0.5	0.1	14	15	16	0.0105	0.0005	0.0005
3	11	0.2	0.1	16	17	17	0.0050	0.0050	0.0050
4	11	0.5	0.1	16	17	18	0.0131	0.0007	0.0007
5	12	0.2	0.1	17	18	18	0.0054	0.0054	0.0054
6	12	0.4	0.1	17	18	19	0.0114	0.0006	0.0006
7	12	0.8	0.8	17	18	20	0.0367	0.0157	0.0050
8	13	0.2	0.1	18	19	19	0.0058	0.0058	0.0058
9	13	0.4	0.1	18	19	20	0.0122	0.0007	0.0007
10	14	0.2	0.1	19	20	20	0.0061	0.0061	0.0061
11	14	0.4	0.1	19	20	21	0.0130	0.0008	0.0008
12	14	0.8	0.7	19	20	22	0.0398	0.0160	0.0049
13	15	0.2	0.1	20	21	21	0.0064	0.0064	0.0064
14	16	0.7	0.7	21	22	24	0.0392	0.0163	0.0052
15	19	0.2	0.1	24	25	25	0.0074	0.0074	0.0074
16	22	0.8	0.6	28	29	31	0.0369	0.0142	0.0042
17	23	0.8	0.6	29	30	32	0.0381	0.0148	0.0044

service classes: voice and mobile transactions. Since the dropping of handoff transaction calls is more undesirable than other calls and wastes the system resources, the proposed call admission scheme gives higher priority to handoff transaction calls. We derived the blocking probabilities of the network and studied their behavior. Then we introduced an algorithm, which minimizes the channel requirement of a cell subject to the all hard constraints on the quality of service of calls. The proposed call admission scheme can easily be extended to multi-classes traffics.

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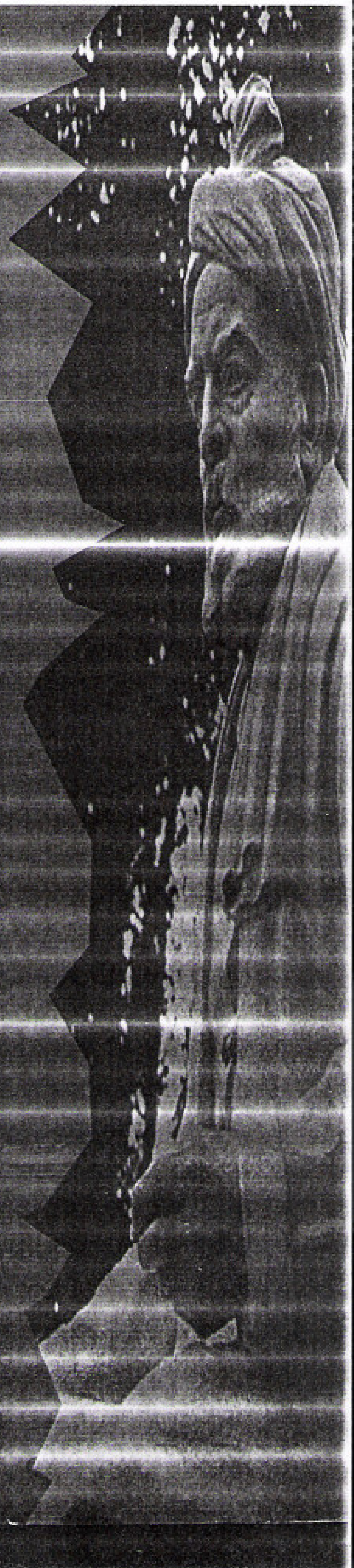

Computer Department - Engineering Faculty
Ferdowsi University of Mashhad
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