Effect Investigation for Soft Handoff Patterns in CDMA Cellular Networks

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***Abstract*--In CDMA Cellular Networks, One of the most important tasks is, transferring from a Base Station (BS) into Mobile Station (MS), otherwise connecting Ongoing Call Channel (OCC) to another Base Station Channel. Whenever changing channel between stations, Handoff is occurred, due to low radio coverage (Time Slot, Frequency Band, and CDMA). This article, we proposed with increase the Speed, Capacity of wireless communication systems Quality of Services, while call is in progress. Our proposed algorithms handle probability of the minimization of blocking new calls and probability of Handoff demands, using Call Admission Rheostat scheme in Cellular communications. Numerical analyses of both the models analyzed using Markov chains and Traffic analysis for optimizing and adding RF channel for a new soft Handoff scheme. This proposed system shows performance and effectiveness of soft hand off schemes (NC, HC), and it improves the channel utilization based on mobility parameters.**

***Index Terms*: Cellular Networks, MS-Mobile Station, BS-Base Station, OCC-Ongoing Call Channel, CAC-Call Admission Control, NC-New Call, HC-Handoff Call.**

I. INTRODUCTION

For the current cellular communication, Code Division Multiple Access (CDMA) has an effective technology network and it contains many advantages, CDMA Cellular system contains many merit features even Soft handoff is paramount. It used for higher communication quality and capacity[1,2]. When ongoing call is dropped in communication network at the time of smooth transition based on the types of handoff schemes, following schemes are mentioned, 1.Hard handoff scheme [19, 20, 27]. 2.Soft handoff scheme.

There are variety of studies which can be explained how to resolve the handoff problems about strength of signal, station distance, traffic coverage and soft handoff schemes have been conveyed in the performance of analysis process. About Soft handoff Studies reconnoitered the effect of the dimension of the CDMA system capacity, hard handoff mechanism. For Load analysis and System efficiency [3,5] are studied in various levels. In CDMA Cellular communication system contains lot of essential enactment analysis like soft handoff and communication passing mechanism [12, 13, 23], Known problem in soft handoff process, is nothing but connection of mobile between two stations. Signal overlap is looked-for because handoff is mandatory in mobile communications systems when an MS passages from one BS coverage area to another for the duration of a conversation. Link between old BS and MS becomes unusable since the dialogue requests to be tendered above to the channel are always critical Otherwise, the call is lost. For this handoff issues handled by Handoff Detection, Channel Assignment, Coverage Link Transfer.

Handling process given briefly in this paper. In soft handoff process [4, 15] with the help of Markov Chain model to estimate the mobile controlled channel Handoff mechanism, assisted stop handoff and network controlled channel handoff [25, 27].

In a fixed cell we are always focusing and fixing a fresh call influx and measure on exploring the reliability trend is always connected with region and coverage region presented is larger than the soft Handoff region area and according with handoff refused probabilities is always lower.

In general communication system with respect to CDMA the relative area cannot be increased and always possession the call onset rate is stipulated; it's denoted and stated that mounting and all transferring soft handoff area space is guaranteed to extend and cell reporting detachment. Accordingly, the Arrival tariffs are pretentious by the dimension of soft handoff area in the overall location. Here in our proposed paper, the amendment on the novel calls entrance amount, on the conflicting the earlier studies, indications the supposition that dealings such as hindering calls with mechanism of handoff denied chance then it will give better of the element with respect to soft handoff area is gets grander.

In section II most of the ideas are discussed. Thus, very little of the prevailing landscapes of the mechanism of soft handoff in one of the main communication system like CDMA are offered in the section III. Drawbacks of existing features are recovered by our proposed method and it is presented in section IV. Overview of our new intended flow chart of cellular system and the proposed mobility effect break down process is shown. Section V Contain the development of Uninterrupted Markov Chain (UMC) model. Consequently, a fixed-point strategy, birth & death rate formula, and optimization problems are discussed. Thus, the planned analysis method for mobility performance increases the system channel consumption and reduces call chances successfully. In Section VI contains in detail about the conclusion part.

II. LITERATURE SURVEY

Our intended CDMA cellular system which is given in a geographical network area is divided into limited cells. The mutual exclusive prying lower a unobjectionable inception is achieved by allocating a stable set of duplex channels in each cell is differed from the adjacent cells. In idle case or free channel the NC is connected and it makes the availability of the new call is attempted when base station starts with hexagon cells if this attempts meet failure then the arrival of fresh call is jammed.

AT the moment of traveling mobile station (MS) is crossed above the NC region and the network in the earlier is portion cell and recreated from started region, and an lazy network is mandatory in the objective cell (near base station),its acts as the fresh offering cell for that existing call. This is called as *handoff*. If there is an existence of idle or free channel is the objective cell, with the remarkable handoff call (HC) remains virtually visibly to the handler. If not, the handoff call is released. This research fully focuses on both radio network distribution and radio frequency disasters. This inspected analysis scheme involves of a vile location organizer networks with multiple vile positions.

Blocking with respect to the new call (NC) is painstaking less forbidding compare with sinking of a handoff call. The purpose of dropping call is to minimize the probability and serve to the preset number of channels. These kind of reserved methods are called as *guard channels*. These methods are temporary and numerous frequency letdown and salvage are discussed in [28, 29, and 31].

Mobility of transfer from Mobile station into Service station is less forbidding with less energy and sinking between channels is also the primary motive. Frequencies between the channels and dropping calls are always decided the performance measurements [22, 26, and 27]. Remarkable performances of the systems are totally enhancing and cut off the free handoff techniques are always measurable at the time of evaluation [22]. Synchronization and measurements between the channels are always measured with bandwidth and frequencies.

III. EXISTING SYSTEM

In CDMA systems, using a pilot method each MS sporadically dealings and calculate the acknowledged signal strength from its near BS's. The pilot method acts as the forward link frequency utilize the method Walsh implemented code to deliver stage orientation for intelligible inflection of a process and device signal. Consumer is collaborating all the time in Base station. Therefore, in the active set, we need to check with transferring in mobile switching center (MSC) and dialogue mounts are presented and communication passes through the entire device via the Base stations. Mobile station is established muscle on or after the base station and reductions beneath threshold *T*DROP, the Mobile station deliveries the trial from the Mobile station Active Set is proposed and transferring in to the surrounding path and Neighborhood Set and then leads to the BS a handoff accomplishment memorandum.

NC-Region of cell A HC-Region of Cell A

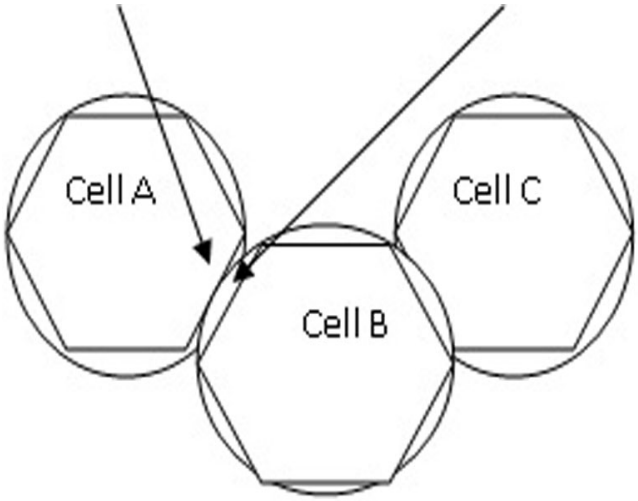

Fig.1.Process model of soft handoff

Cell is always covered with handoff area and normal boundary and assumed that six cells are surrounded. A handoff threshold like TADD and TDROP is serving as a broadcast by the base station. Communication Ratio minimal of β is the handoff part to the complete cell part is given as

$$\beta = \frac{the\ area\ of\ the\ handoff\ region}{the\ area\ of\ the\ cell} \quad \ldots(1)$$

Sort handoff part is nothing but the intersection of two cells and every Mobile station has 2straits in their Active Sets (Fig. 1). In cell A is be idle state , Cell B is access time and Cell C are traffic time and Cell A represent the frequencies conversion between the Cells with respect to the bandwidth and make them be in the idle state. Handoff Cell B is permitted the movements of the signal with respect to TIA/ EIA – 96, but not in IS – 95 A. Similar with respect to the Cell C is referred with Traffic. Cell C is referred the transition from one cell into the next with soft handoff or hard handoff methods and same time traffic between the signals and systems are always measurable for the purpose of performance evaluation. Soft handoff is the breaking of the cell and handshaking is also used to break the process of establishing a link with a target and break cell measurements with servicing call and pilot channels are cut on the frequencies and detect the potential candidates for handoff. Cell A , Cell B and Cell C are measurable the idle state, Access and Traffic how signals measurements are made in between in CDMA handoff systems.

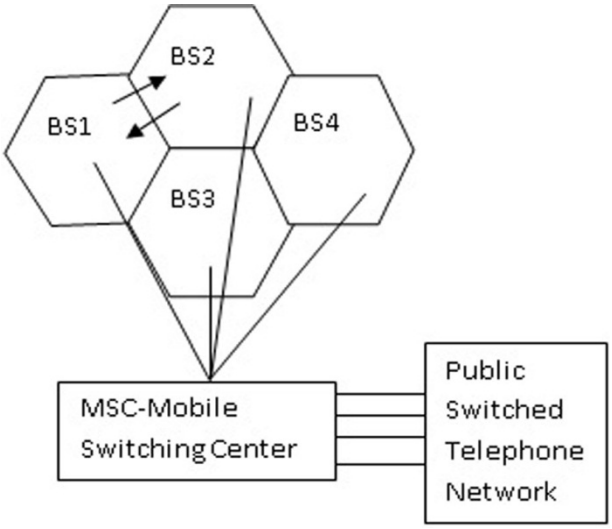

Fig. 2. Cellular configuration of the spineless handoff.

In Active set it contains lot of base station and US IS-95, shows the handoff process in active set. In Active set is smaller than TDROP and conforming the Mobile Station leaves the handoff extent is always the short and normal duration.

IV. PROPOSED SYSTEM

For lenient handoff in CDMA process is grim and describe owed to its numerous parameters, based on that may be lopsided cell margins, automatic traffic variable conditions, and mobility of cells. Simplification of the method, need to do the succeeding judicious performance expectations.

1) Cellular model embraces a numerous of hexagon booths of duplicate dimension form, almost the circle is the approximate coverage area.
2) In each cell are uniformly distributed in mobile and initiates the calls and out of many single mobile unit is only having chance to transfer in specific time.
3) In Active set all the part of the cells are around with six different cells.
4) Active Set, Mobile Station in handoff area conquers maximum two channels.

Received pilot strength decreases and as well as increase from various Base Station and it's transferring into the Mobile Station interchanges away from the BS and moves toward the Base Station respectively. The pilot strength of the handoff area can be detected from the serving Base Station is synchronized.

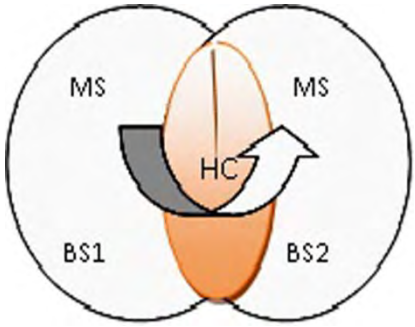

Fig.3. Handoff Call area, MSs from BS1 to BS2

Transferring time it's assumed*ps1*(*t, i)* be acknowledged model forte after starts allocation Base Station unrushed at value of time *t* by Mobile Station *I* and time rate is also measured with *cr1_ps1*(*t, i)* and rate of value with time and total proportion of variation of *ps1*(*t, i*) given by

$$cr_{ps(t,i)} = \frac{ps(t+\Delta t, i) - ps(t,i)}{\Delta t} \quad \ldots . (2)$$

Where Δ*t* is the time historical of updated evidence is the main process.

According to CDMA that MSC would intimate and the new structure is calculated and it has been discussed follows

```
Step 1: Identify the position of handoff calls (with two or
more channels in the Active Set)
 for (m MSs in the handoff area of the target cell)
{
   for (q desired values of t) {
  Measure pilot strength of MS i at the target BS: psT (t, i)
     Measure pilot strength of MS i at the
     neighboring BS: psN (t, i)
     if
     psT (t, i) > psN(t, i), the MS belongs to the
     TC region
     else
     the MS belongs to the NC region
      }
    }
Step 2: Evaluate the mobility of handoff calls
for (m MSs in the handoff area of the target cell) {
      for (q desired values of t) {
      Measure the pilot strength of each call or
    MS i at the target BS: psT (t, i)
    Compute cr_ps (t, i)
    if
       |cr_ps (t, i)| < _, the MS is considered
       Stationary
    If cr_ps (t, i) > 0, the MS is considered moving toward
the target BS
    else if
    the MS is considered moving away from the
    target BS
    }
 }
```

Above algorithms are used to categorize the situation of handoff calls status. This is very essential and doing major role for transferring one Mobile Station into Base station. Every time Mobile station into base station we need to check with Synchronization. Let time t and I interval is noted for changing of position ps (t,i). Controlling and Non-controlling Base Station besides with cell ps(t).

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BS B is controlling (non-controlling) BS for MS1 (MS2),
 and is non-controlling (controlling) BS for MS2 (MS1).
Besides, with respect to cell A, cr_ps (t, i) < 0 for MS1
and cr_ps (t, i) > 0 for MS2.
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In Fig. 1, Active set contains both MS1 and MS2 channels. It describes that the model métiers the MSs acknowledged from communication of all the cells A and B are grander than *T*ADD. These synchronizations are more essential it shows the unique and fading characters and also proposal of the mobility is essential. With respect to the wireless channel fading characteristics and uniqueness and mobility estimation with all the needs and significant refinement process are calculated when it is implemented commercial into the appropriate system. Value of *ps* (*t, i*) is nothing but strength of pilot signal and it is received from the given samples. Measurements results are always shared among dissimilar BSs into supplementary progress appraisal accuracy and the following section discussed with innovative soft handoff pattern suggested. In this paper other than handoff mobility information, reliability, security, Track monitoring is out of scope. CDMA handoff is concentrates well.

RF Channel Allocation process in Soft Handoff Scheme for New Calls and Handoff Calls

In CDMA contains lot of cellular features especially handoff is doing major role and it occurs in two different situations. In first case in Mobile station (MS) calls are transferring into normal area into the process into handoff area.

In CDMA System requests of handoff are categorized into two systems in first phase active calls are always moving from normal into neighboring cell and it will cause the mobile station is also generate request from a channel/ frequency into target Base station. In second phase when fresh call is instigating in the NC area and real soft handoff is transferred into neighboring Base station. Though the cell A in Fig. 1, an Here *dr_ps1* (*t, i*) <0, but not compulsory into cell A. Totaling to that the Mobile Station is corresponding with the NC major section of cubiclesubstantial|*dr_ps1*(*t, i*)| < _ not compulsory into be passed concluded to cubicle A either. Similar New fangled demands with NC jurisdiction and the corresponding the handoff zone with transfer the infor-

mation from Mobile station into Base station is the objective cubicle and placated$r_ps1(t, i) < 0$ or $|dr\_ps1(t, i)| < \_$ *is* demarcated and virtual handoff requests are the most significant penalty area chamber.

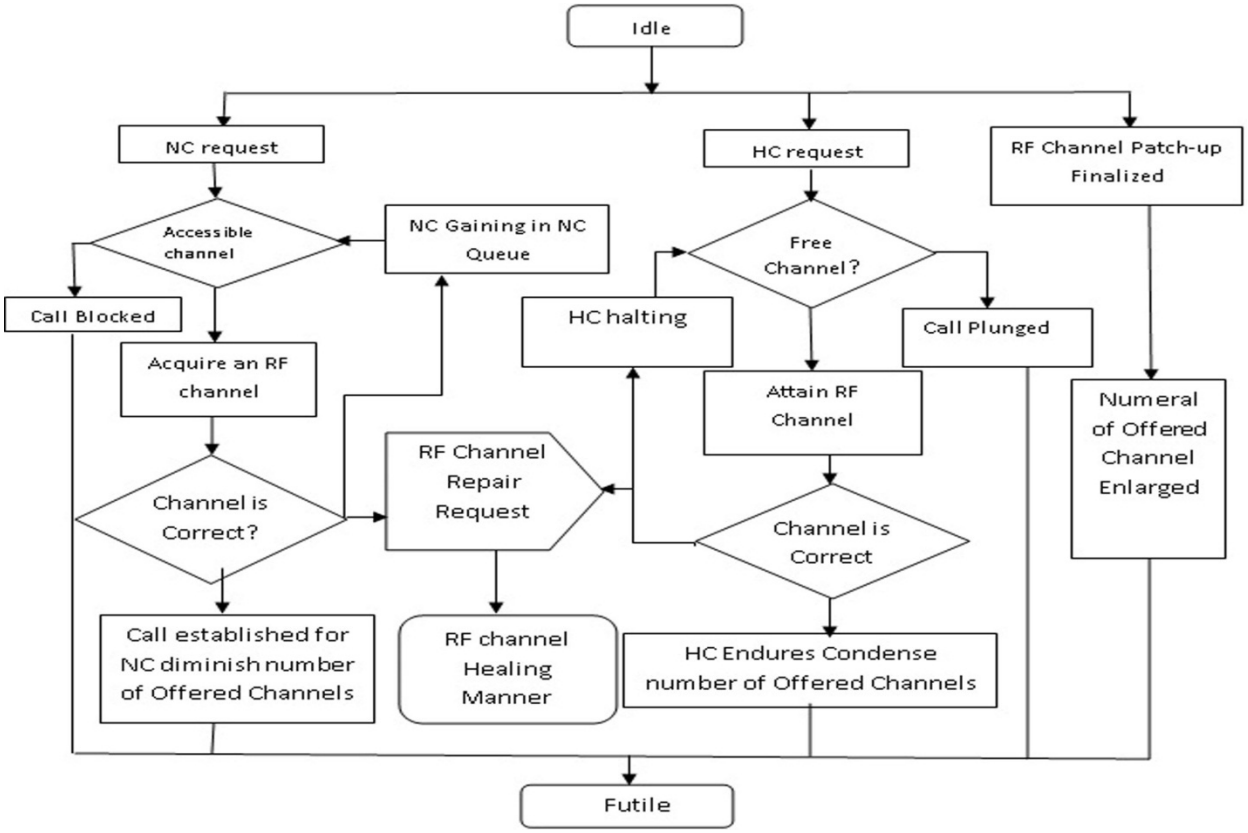

Fig.4.Flowchart for the RF frequency portion progression

In the System most probably Material handoff Demands are called are called since it's operated from Mobile station into Bas station. Whenever you want to improve the channel efficiency and performance assignment we always need to propose the handoff schemes in HC and it is well described in Figure 4. Movement is unhurried first at what time a handoff demand arrives. In free channel a wannabe handoff call is disregarded and. Most important unique features of handoff call is waiting in the order when no channel is currently available otherwise it will check the queue status and refused automatically if queue is full. Every time it will check the queue since overflow or underflow process is also monitor in the purpose of efficiency. The above said process is automated without any interruption.

Handoff call is dropped or maintained is not a major issue since it's refused automatically. Handoff calls is always connected with queue and transferring from handoff area into normal area and IS-95/CDMA2000 includes new soft handoff scheme, and system concentrates the eminence of voice same time the overall snooping in the models are not ominously prejudiced. The overall parameter ranger is using an uplink snooping in to the CDMA model, at the time of demodulate the signal higher receiving power is also taking care much same time it is calculated the and the same time we need to think about the other side of transmission of pseudo handoff calls, deprived of the non-controlling frequencies with respect to the Active Set, will endure virtually the identical. Besides, the new outline is not ensure to entail hardware modifications and updating germane model components like MS, BS, and MSC, while few software apprises is not necessary. Meanwhile reckoning upstairs is pretty little in to the model, the routine enhancement is well offset the charge of employing our procedure into CDMA systems.

V. ANALYTIC RESULTS

In Section V we are Proposing soft handoff schemes for UMC model. Presentation files are precise and other important method is nothing but closed-form jargons are consequent, and bringing into the notification to the standard recapitulation to control the handoff onset proportion.

Developing Soft handoff for handoff queue in to Markov Chain process

Transferring from Mobile station into Base station we always need to check with neighboring cells either the behavior is statistically identical or it behaves identical. Synchronization is needs to be maintained. In CDMA

cellular system performance model of each and every cell is maintained and we mainly deal with specific cell performance. Transferring from base station into mobile station fresh calls and one of the handoff calls are 2 kinds of call system. Poisson distribution rate $\lambda_n$and $\lambda_{h\ is}$ distributed overall into the system.

Hexagonal area is controlling with all new call arrivals of target cell. Limited number of frequencies in N and the network pool q is maintained. We are finding out the total number of channel and calculate handoff because we need to concentrate dropping handoff call. Dropping call is less anticipated than novel arrival call. Check out the g channel availability and idleness; if not fresh call is stopped. Each and every handoff need is supposed to be detected in our system and the assignment of the frequency is rapid when it is existing. Check with idle channels availability for maintaining handoff in the queue. We are calculating the maximum handoff queue extent and property of transferring time $T_{d\ and}$ the value of vertical and horizontal mean lodge stint T_{dc1}in the unabridged exterior range of cubicle inspection exponential circulations and resources $\mu_c{-}1$and $\mu_{dc}{-}1$, correspondingly.

Moreover, at the time of transferring the call always proportionate and handoff demand line up is required with fire when the call transfers and passing into the radio reporting area of the adjacent cell. Agreeing reside value time and dispersal is estimated and the exponential with mean $\mu_l{-}1$. We proposed the system in a standardized UMC of the birth–death type. Demanding channels and frequency are taken in the form of C(t) is define UMC signify the number of demanding channels of a proposed and methods are transferring into Stated the Markov chain with respect to birth–death process is explained in the mentioned Fig. 4.

Birth and death rates dependent even it has been calculated by transferring from Mobile station into Base station. New call is blocked and channel is calculated of busy schedule and maximum than the channel distribution is always $M{+}N\ {-}\ g$, Where $\lambda_{1c}{=}\ \lambda_n(3\ {-}\ \beta/4)\ {+}\ \lambda_n(\beta/5)P_b$, $\beta 1$ is the proportionate value of the NC section with major sheet chamber, and $P_{b1}$is the novel demand hindering possibility of the cubicle, and this things will be made advanced. Always look for the distribution and how it's all fresh calls in the goal cell can be distributed with two different phases and it is nothing but the regular area plus TC province of the cell, around with other neighboring cells.

UMC birth rate is

$$A(n) = \begin{cases} \lambda le + \lambda h\ if\ n < N - g \\ \lambda h\ if\ N1 - g \le n1 < N1 + 1e \end{cases} \ldots\ldots(3)$$

UMC birth rate is measured with transferring the signals system with respect to the corresponding variable of M+N-g. If n measured values are dependent with variables and it is usual lesser than N-g based on this N1 is also lesser with N1-g. This significance leads to the parameter evaluation.

The death rates of the UMC $M1$ (n) are

$$\beta cx(n) = \begin{cases} N1\ (\mu em + \mu de)\ if\ n \le N1 \\ N1(\mu em + \mu de) + (n - N1)(\mu em + \mu 1)\ if\ N1 < n \le N1 + le \end{cases} \ldots\ldots(4)$$

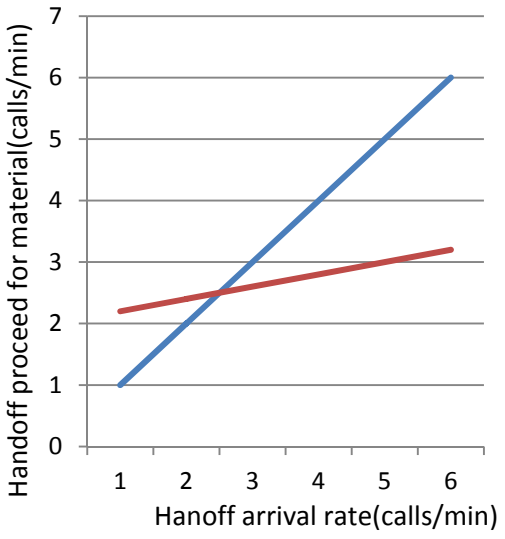

Fig. 5. Markov chain Architecture for CDMA handoff schemes.

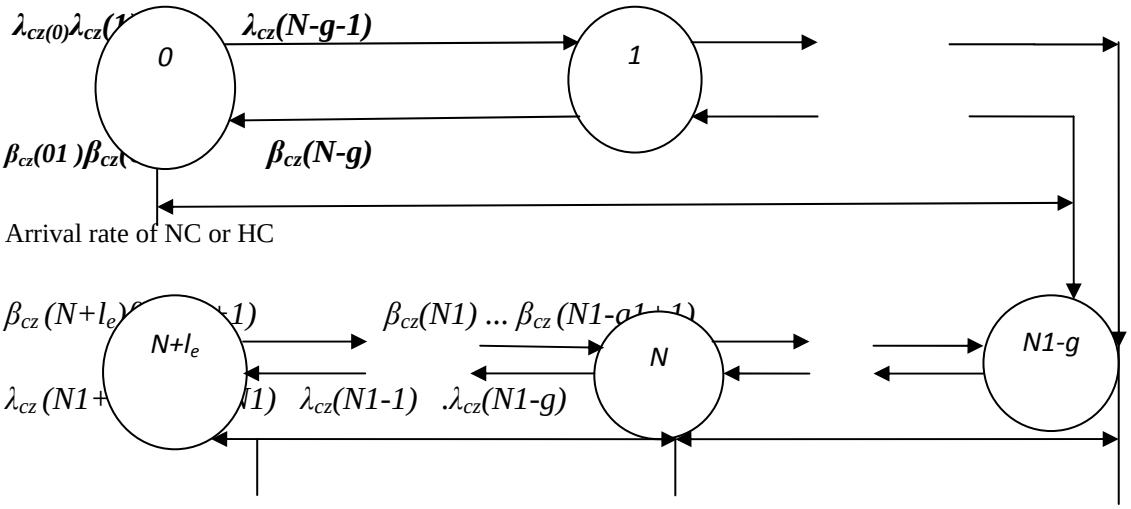

Fig. 6. Markov chain Architecture for CDMA handoff schemes.

VI.CONCLUSION

Our main intention is to propose the cellular geometry and soft handoff schemes and relative mobility algorithm. Mobility estimation new soft handoff is also processed and we are increasing the channel distribution and utilization based on this reducing the handoff dropped possibility. Analyzing the enactment of real soft handoff method in CDMA systems and Cellular arrangements, Markov process chain method are used and based on this we calculate the formulae and how systems are getting down. Realistic approach is also questionable for call dropping facility and CDMA handoff is also used in this method. Stable algorithms are used to provide principles and provide the solutions of the problems and determining the finest numeral of protector channels. The outcomes expression that the wide-ranging retrieval system shrinks the fallen calls and the blocked calls transferring the path optimum calculated. Transferring time in the recovery model numerical results are entitled we undertake that the repossession prototypical can disregard the plunged/blocked calls initiated by frequency damages. Under heavy circulation, though the repossession process can tranquil diminish the plummeting with hindering prospects of inadequate fraction; adding with all the maximum amount of RF channels would be downright commended to the working companies for better patron agreement. The method for fleeting and numerous channel disaster and recovery are also concluded.

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