

Comparative analysis 4G mobile Communication Handoff

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Abstract: Every new day increase the mobile user and user have use different type of multimedia application (video, voice calling). So more traffic in network. 4G handoff schemes within a pathological environment are soft handoff, hard handoff, vertical handoff, horizontal handoff. Advantage and disadvantage of soft handoff and hard handoff are defined in this paper. Also the necessities of handoff mechanism like bandwidth, velocity are also explained. Network size is big so high power Consumption and high traffic. 4G handoff is the main part in network security. Here, comparative study and analysis of different types of handoff strategies is done.

Keywords: Handoff, vertical handoff, horizontal handoff, Network.

1. INTRODUCTION:

4G communications are the wide ranging networks. In network users have union set of device to Eruption connectivity to minority extent time and to minority extent place. 4G Communication in excellence audio/video flow throughout ranging network [1]. Nowadays WLAN, Bluetooth, UMTS, and CDMA2000 all are Unification in to IP-based system a cloud shape. At present, extensive research work on handoff issues in 4G systems, effort on keeping unbroken transport network, with timely location update or reducing handoff expectancy[3]. Also many Packet are loss in IP-based ranging networks.[1] Momentary and silver-tongued ranging handoff is a big question for 4G heterogeneous ranging networks that are to ratification actual high data-rate multimedia applications that have need of, small handoff slow up and more data-rate transmission. Handoff means shifting an ongoing call or data periods one fraction to another [2]. Handoff take place directly to the steps forward of the mobile operator from a few zone to a different zone. Handoffs are utility to, put a stop to an on progressing call to be disconnected.

If we don't use handoff then on every cause a user change the place or area a particular progressing call is immediately disconnected. Handoff in number off parameters required. E.g., which handoff scheme is comfortable to user, than handoff process will be easier and number of free channels at handoff time [2].

Quality of services is good in handoff process. Vertical handoff process transfer the call to neighbor network.

In this handoff, one fix channel joined in working cell to the inside core network to another network. A rightly designed device uses both technologies at a same time, high speed Wireless LAN and pathological technology. Wireless LAN connections generally provide greater bandwidth but smaller coverage area which in turn provides smaller bandwidth. While when the channel is busy, one can switch to a pathological technological connection as an alternative.

In vertical handoff, automatic switching is performed from one switching network to other switching network. So, it is unique from a horizontal handoff in various access points wireless network using the same technology. In this paper, efforts have been made to find the characteristic degradation during vertical handoff and also tried to suggest some points to maintain a minimum standard of characteristic during handoff.

“Hand off means call is working without break off when mobile signal moves from in or out place from the base station signal.”

2. CLASSIFICATION OF HANDOFF SCHEMES WITHIN A PATHOLOGICAL ENVIRONMENT:

Handoff Management balances when there is change in traffic across network cell boundaries. Signal quality parameter is good while power consumption becomes low, during the change in the cell boundary. 4G Handoff is recently ongoing in United States.

Hard Hand Off

User uses the mobile, many radio channels assigned in handoff. Radio frequency spectrum shares the same number of channel in every cell during hard handoff[1]. Frequency spread

spectrum is same for all mobile users but different ground base stations control the radio communication.

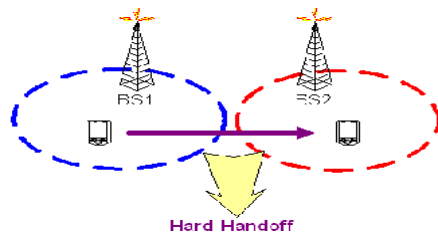


Fig-2 Hard Handoff[2]

Soft handoff

Mobiles select the instantaneous neighboring base station signal which is referred as soft handoff[1].

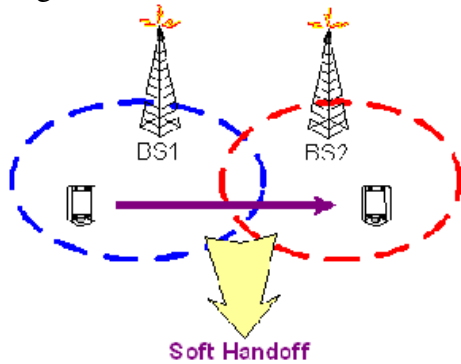


Fig-3 Soft handoff[2]

TABLE-1

| Scheme | Advantages | Disadvantages |
|--------------|--|--|
| Hard Handoff | <ul style="list-style-type: none"> Efficient use of spectrum No data Overhead | <ul style="list-style-type: none"> Short interruption of service Sensitive to link pass on-time (may result in cut outer call) |
| Soft Handoff | <ul style="list-style-type: none"> Highly reliable (several active links used simultaneously no service interruption) No loss of QoS during handover | <ul style="list-style-type: none"> Inefficient use of spectrum Data overhead |

Horizontal handoff

4G ranging networks works in different node, inside node moves between two gain access to node points and both nodes consist of same

network system [2]. The major part of this handoff is low level signal intensity, local nosiness and channel slots are balanced.

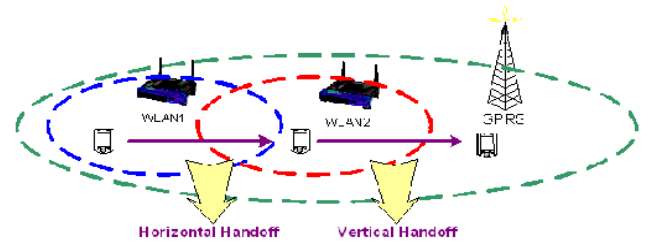


Fig-4 Horizontal handoff and Vertical handoff [2]

Vertical handoff

In Vertical handoff, the inside node between two gain access node points. Also both nodes are of different ranging network system. The major part of this handoff is a low signal intensity and local nosiness [8].

TABLE-2 Difference between Vertical/Horizontal Handoff

| | Vertical Handoff | Horizontal Handoff |
|--------------------|--------------------------|--------------------|
| Access Technology | Changed | Not changed |
| QoS Parameters | May be hanged | Not changed |
| IP Address | Changed | Changed |
| Network Interface | Maybe change | Not changed |
| Network Connection | More than on connections | Single connection. |

Capabilities Of Vertical Handovers Over Horizontal Handoff Are[3]:

- Vertical handoff use number singular access Technology.
- Horizontal handoff use single network interfaces but vertical use multiple.
- Horizontal handoff in single IP addresses and Vertical handoff in multiple IP addresses.
- 4 Quality of service is good in vertical handoff.

Network discovery

A base place explores the mobile signals within reach wireless ranging networks during the network location sort out. A several mode mobile

terminal must be ready to receive benefit classified advertisements from local stations [4][5][6] which is broadcasted by number of wireless equipment. A wireless ranging network is on hand if the classified advertisements are heard by the mobile station. The simplest way to discover on hand wireless network is to keep the access points on forever.

Handoff Decision

Handoff decision decides that which working network is attached at point of time. This way it permits the best working network to be decided and handoff is originated to that network. [3] In true, based on the gathered information, the available local nosiness, the user predilections and the black list data, base place appraise the nearby working networks and pick out the most proper network.

Handoff Execution

The main aim of handoff implementation is to continue term permanent while changing the point of warmth. Handoff goes by approach ranging network selection then after a new link is setup, all the communications associated with the old link are transferred to the new link[1]-[3]. The manipulation signals and data envelopes are distributed to the connection conjoin with the new base station or access point. If one of the approaches of ranging network clash from the other one, then there is a choice of handoff implementation is function. The network selection will attempt to select another access network whenever the handoff fails.

3. NECESSITY FOR HANDOFF MECHANISM:

1. *Bandwidth*
2. *Handoff Latency*
3. *Power Consumption*
4. *Network Cost*
5. *User Preferences*
6. *Network Throughput*
7. *Network Load Balancing*
8. *Network Security*
9. *Received Signal strength (RSS)*
10. *Velocity*

1. Bandwidth

Bandwidth is an evaluation of the girth of a stretch of incidence. It is the dissimilarity stuck between superior and let fall incidence in an adjoining set of incidence. In request to care for

harmonious handoff of Quality of service in wireless background[7], there is a requirement to control bandwidth usefully of mobile knob movement time[4]. Bandwidth is commonly known as the link capacity in a network Higher offered bandwidth ensures lower call drop and call blocking probabilities; hence higher throughput If Network bandwidth is high then there is a chances of lower call dropping/blocking and call blocking/spoiling and hence higher amount bandwidth handling should be an impotent part of several/any of the handoff method.

2. Handoff Latency

In Handoff, two neighbors base station are chance upon regularly and the holdup occur time the full of process handoff. This holdup called handoff latency[1][3][6]. Here, good handoff and bad handoff process occur. Now to select the good handoff design, one should use handoff latency dynamically and the handoff latency should be lessened. Now many of the handoff latency design have been applied to low the handoff latency by Legal Corporation in their handoff design[8]. Handoff latency process have effect of many service application in mobile people.

3. Power Consumption

In 4G, wireless networks increase the energy levels. Energy is not only saving by user base station but also aspect to base station tools. Energy is saved in the full process of handoff or mobile has changed the directions [3]. In this process, handoff in local nosiness can cause extensive array outflow. The main part of this is to save power in no more local nosiness and unused network will switch off[5].

4. Network Cost

Standards process are to followed in order to have Network cost component. The cost component is very low in vertical handoff time. Now, a new call at everytime is Handoff is initialized by a check using component function. 2G, 3G and now 4G communication network in have advantages like network range and more Quality of service and data rate per sec. to mobile users. In such background, multi local nosiness station are same switch from transform one network to new network another at improved continuous wireless connection.

5. User Preferences

When handoff takes place, user can also define various preferences according to their network occurrence parameters. User can choose good networks, real time use and non-real time use application and different type of services like voice, data, video and Quality of service. Users have chosen the vertical handoff.

6. Network Throughput

Network throughput check the data rate average of successful data and packet that are transmitted through proper network communication link, also checks the data rate bits per second(bps)[2]. In this, the highest network throughput corresponds to the TCP windowpane size serialized by the round-trip time of communications network data packets[3]. Vertical handoff is most important in Network Throughput side.

7. Network Load Balancing

Network communication load is considered during full process useful handoff. It is most important to control the traffic loads cells that downgrade the traffic-carrying capacity [2]. Load balance is good so Network also provides the high quality service communication for mobile user.

8. Network Security

Day to day increase in the mobile user, and also the increase in the number of networks, demand the importance of handoff. Such that network in own network security policies. Network monitors and controls the unauthorized signal access, network resources, misuse etc. In all networks, data is broadcast through air, in air not have any type physical controls full of boundaries of transmissions side[3]. Network security uses the specific protocol and makes the highest levels of authentication.

9. Received Signal strength (RSS)

Wireless network performance also depends on signal strength. If mobile user is at long distance from base station so received is low and received signal is high to nearby station. The transmitters signal is same in each direction [2][3]. A signal must be good between mobile unit and base station to control the signal quality at receiver side. The strength Received signal must not be less than certain threshold level network during handoff.

10. Velocity

Velocity should be considered in the full process of handoff decision. 4G communication design of heterogeneous network indicates off to an embedded network, at small cell region. If the travelling speeds of any mobile user is high, at time signal will be degraded due to frequent change in stations and will be back to original network range.

4. DIFFERENT TYPE OF HAND OFF STRATEGIES:

TABLE-3

| Prioritization | Advantages | Disadvantages |
|-----------------------------|--|---|
| Static channel reservation | Easiness | Hard to change traffic |
| Dynamic channel reservation | Easy to traffic change situation | Computation and signaling upstairs |
| Static queuing | Easy to apply | Difficult to accommodate multi-time traffic |
| Dynamic queuing | Reflection of the dynamics of the user of the motion | Computation and signaling upstairs |
| Channel transferred | Increases System efficiency | signaling upstairs |
| Subtracting | Increases system Efficiency | Quality of service down |
| Genetic Schemes | Increases channel utilization | Delay needed to assign channel |
| Hybrid | expand channel utilization Decreases blocking probabilities | complicated to find the optimum combination |

5. CONCLUSION:

In the paper we have carried out the 4G handoff technology for heterogeneous networks. Handoff schemes within a pathological environment in soft-handoff and hard-handoff, vertical handoff

and horizontal handoff are explored. Hard handoff does the efficient use of spectrum and has No data Overhead while soft handoff in several active links uses simultaneously no service.

There is minimum Interruption and QoS is maintained during handoff. 4g network has good bandwidth, low power consumption, low network system design cost. With the increases in the day to day mobile users, network security has become more important in communication time. Base station helps in reducing the traffic in the channels and load balancing in network. 4G handoff technology is faster than 3G.

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