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DELAY ANALYSIS ON SEAMLESS MOBILITY CONNECTIVITY IN WPAN USING NS2.34

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Abstract: The advancement in mobile and wireless technologies, specifically the personification of many devices tremendously increases the challenges to create a perfect trade-off link between cost, mobility and performance. To fulfil the requirement for providing best network to the users, many reflective criteria of accessed characteristics of various wireless networks such as WLAN, GPRS, WPAN have to be tested, judged and established. This paper includes the seamless mobility handover issues of wireless networks for future generation. The routing of messages can be performed in mobility network by using various network simulators. The network simulators such as NS2.34 which helps to reduce the cost of mobility handover with minimal delay. A sensor in the mobile during the process of mobility handover generally does not much bother about the care-of-address, so there will not be any requirement to perform connection between the care-of-address and home address. This is the major reason behind the reduction of handover cost and delay reduction. Therefore, we are highly motivated to use substitute location server to understand the location management. The present research work contains the understanding and explanation of simulation model proposed on the basis of step -length. The approached simulation model is the best alternate solution for similar mobility. The seamless mobility connectivity in WPAN have been implemented by using NS2.34 which helps to improve the performance and evaluate the handover latency measurands.

Keywords: Seamless Mobility, Wireless Personal Area Network (WPAN), NS2.34 Simulator, Handover Delay.

INTRODUCTION

The increase in demand of using multimode mobile devices, the regular switching between the networks and simultaneous multi performance handover will very frequent. The better network can always be available in either condition of user being away from the located point or due to overcrowded network. The possibility of handling many users performing simultaneous handovers at the same area is the initial property for selection of networks. In general, the group handover performance happening in any mobile devices cannot be controlled by users. Therefore, to get the information's of users performing mobile task seamless managements can be operated without any further considerations. The concept of seamless mobility used widely to obtain the information related to access time, place, network and devices in the continuous manner [1, 2]. The seamless mobility system also plays an important role to manage the broad wireless system in view of delivery of seamless data. Cheng et al has introduces the protocol for seamless data delivery for network based on multi-hop-cluster [3]. The seamless connectivity is also useful for modifying the network connections based on internet protocol without any disruption and loss with respect to present status of the network. The node or junction at any networks is essentially important to reduce the points of locations and connections [4, 5].

The present generation and advancement of wireless network technology has transformed the communication world. There are many technologies simultaneously working to provide high speed broadband and seamless mobility. The series of wireless networks get evolved from conventional technologies such as GSM evolved to UMTS and further 3G; IEEE 802.11 series has also accepted the local high speed wireless access [6, 7]. In addition to all these above technologies wireless personal area network (WPAN) has benefited with Zigbee and Bluetooth networks. All these defined wireless networks installed with the condition of overlapping networks which helps to form a hybrid network to access any wireless system, and the entire system is called as heterogeneous wireless networks [8]. Multiple devices such as laptop or mobile supportive with multiple wireless networks will be installed to get the internet connectivity via hybrid networks.

The network connection with minimal disturbance as well as free roaming is the basic function and meaning of Seamless. This process also make user to freely switch the networks available at their present area. The overall

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understanding of handover technology most of the time are unnoticed by the users. Each communication network or session has its own requirements which cannot be disturbed by the handover like the delay, error rate and security level. There are majorly 4 types of available networks (WMAN, WWAN, WPAN and WLAN) which can be chosen by using six different functionalities such as bandwidth, cell radius, power consumption, security, traffic and price. So, each network can be selected by using all the combination so it would be easy for user to get the quality and required services. Table 1. shows the combinational properties for selecting the network attributes.

Table.1. The combinational properties foe network selection on the basis of various attributes

Applications Attributes	User Attributes	Terminals Attributes	Final Combinations
Conversational	Money	Battery	Conversational-Money-Battery
Conversational	Money	Mobility	Conversational-Money-Mobility
Conversational	Quality	Battery	Conversational-Quality-Battery
Conversational	Quality	Mobility	Conversational-Quality-Mobility
Streaming	Money	Battery	Streaming-Money-Battery
Streaming	Money	Mobility	Streaming-Money-Mobility
Streaming	Quality	Battery	Streaming-Quality-Battery
Streaming	Quality	Mobility	Streaming-Quality-Mobility
Interactive	Money	Battery	Interactive-Money-Battery
Interactive	Money	Mobility	Interactive-Money-Mobility
Interactive	Quality	Battery	Interactive-Quality-Battery
Interactive	Quality	Mobility	Interactive-Quality-Mobility
Background	Money	Battery	Background-Money-Battery
Background	Money	Mobility	Background-Money-Mobility
Background	Quality	Battery	Background-Quality-Battery
Background	Quality	Mobility	Background-Quality-Mobility

With the increasing demand of wireless sensor networks with internet protocol version 6 (IPv6), the version 6 of low power wireless personal network (WPAN) has also become important of the future applications [9]. The increasing requirement of mobile communication and network services, WPAN network can find the specific place to provide good mobile handovers supports [10]. The discussion on using WPAN is still an open problem in spite of knowing the futuristic advantages of it [11].

Therefore, this paper includes the seamless mobility handover system for WPAN. The seamless mobility in this context helpful and advantageous in many manners such as:

(a) The length of the controlled message can be reduced which will reduce the delay and transmission cost.

(b) Seamless mobility handover mainly works with the hierarchical structure and address at network node which are favourable for compression of address length. The reduction of address length will also affect the delay and cost of data transmission.

(c) The cost and delay of data transmission is also controlled by seamless mobility handover techniques with automatic routing the controlled message directly to the destination without any routing history or discovery.

Simulation Tools and Methodology

The issue of mobility in the telecommunication which defines the change of cell location from one place to another with the change in access points is require a great attention. It could be resolved by enabling the requirements of handovers at once with proper mobility protocols. In general, the simultaneous mobility can be disturbed by irregular mobility but may lead to the problem of missing some updates related to bindings which can be obtained from different mobile junctions [12, 13].

The improvement and continuous extension of basic network simulators (NS 2) and its regular progress has been broadly discussed in this paper. NS2 usually helps to make a LAN by using make-lan command. To represents any address NS2 uses 32-bit address which broadly classified into 3 major parts such as Domain, Site and Node numbers represented by highest 10 bits, middle 11 bits and lowest 11 bits respectively. But for network mobility such broad divisions are insufficient. The overall mobility is depending on the interrelation between domain which incorporate with many base stations and every individual base station is connected with a site which are responsible for various node. Therefore, we can also say that each base junction can be reached to base station in direct or indirect mode. A mobile network is very important for WPAN, so this research work should provide a similar notations and commands to build a

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regular mobile network.

Quality Network Provision

The test attempts of an algorithms using NS2.34 simulators gives a proper information regarding the requirement of understanding of internal structure of simulators, and adding and rebuilding of the codes which are the major factor to improve the quality provision of the users. The selection of a quantitative adaptive delay technique which can be useful for multi-user handover mobility. The network selection on the basis of above technique will also be useful for providing best quality network. The qualitative technique using NS2.34 mainly select any networks which consider the controlled-terminals in the infrastructure-based networks. The NS2.34 algorithms provides the detailed view of network conditions with a regular awareness of user's mobility handover. The detailed explanation and working of the simulators will help to overcome the mobility handover, delay and cost of the quality network.

Constant Computation Route in NS2.34

The constant route of any network topology can be generated by using code "$ns run" in NS2.34. Following rules should be carry out by NS2.34 for constant computation route. The number of domains, site and nodes in the address should be minimal. This also explains the continuous of the address bit in such a way that if previous address is missing domain 2 than domain 3 can't take its place. Therefore, the sites present in network mobility simulations can be further divided the hierarchy of address which will discontinue the address inside a site. The hierarchy address of the network is designed by using following steps: A site consist of 21-bit prefix which are based on base station with the suffix of 0. If the base station will become a hierarchy address for certain mobile networks, then it would be having m-bit prefix which lies 21 to 32 bit and left out bit will be used for mobile networks. Fig.1 shows the work flow and creation of network using NS2.34.

The simulation method has been implemented by using following:

(a) Creating a simulation model for a particular mobile IP-address networks.

(b) The execution of IP-address network model using NS2.34 simulator.

(c) The programme should be run to obtain the performance matrices.

(d) At last analysis of obtained results as per the behavior of protocols in the mobile network system.

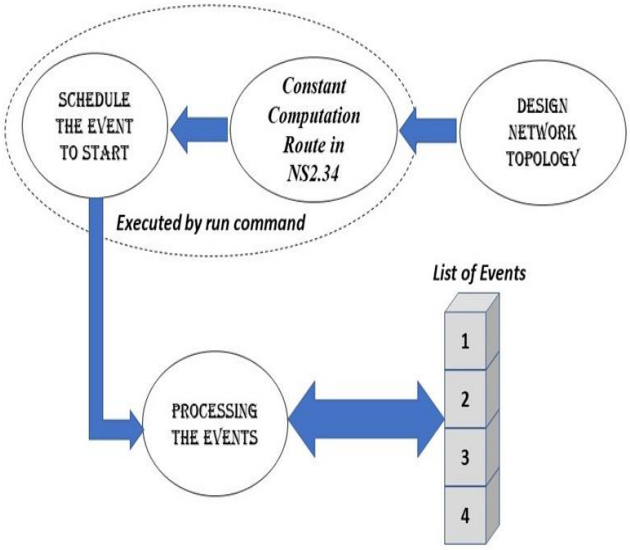

Fig.1. Constant computation route of NS2.34

Delay Analysis

The delay reduction approaches will also be studied with the performance and output of the simulation method. The main objective of the simulation method is also helpful to study the performance of seamless mobility on handover delay and cost.

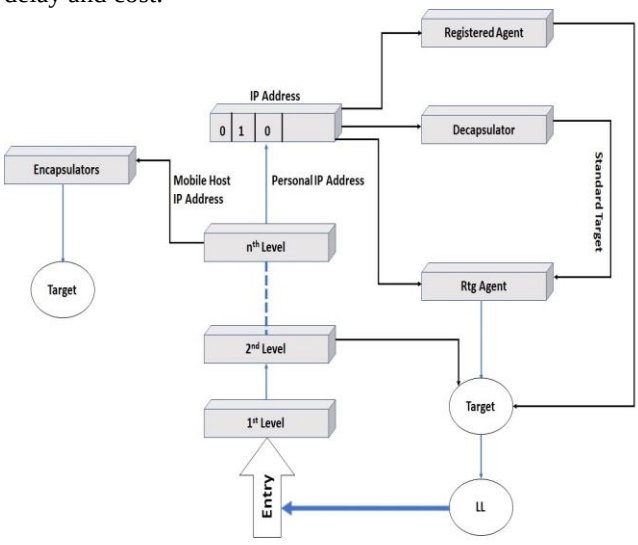

Fig.2. Model of NS2.34 simulation of mobile network junctions

The delay reduction approaches will also be studied with the performance and output of the simulation method. The main objective of the simulation method is also helpful to study the performance of seamless mobility on handover

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delay and cost. The network simulator NS2.34 is an overall package which helps to replicate the network topology and Fig.2 represents the all-mobile junction used by NS2.34 simulators. CMU Monarch's model provided the information regarding the NS2.34 method which helps to create mobile and wireless network protocols [14]. This simulation model separates the junctions with more interface to the wireless networks. The main function of the wireless channels is to create and interface with packets presents in all networks [15].

The NS2.34 was implemented to run the simulation and following steps are followed:

1. At first the topology and traffic files using cbrgen and setdest was generated
2. The TCL script was written and executed by different commands
3. The NAM file (TCL based animation technique to view simulation traces) and trace files was generated
4. The performance parameter "Delay" was selected and execute the programme to obtain the delay performance and plotted the graph.

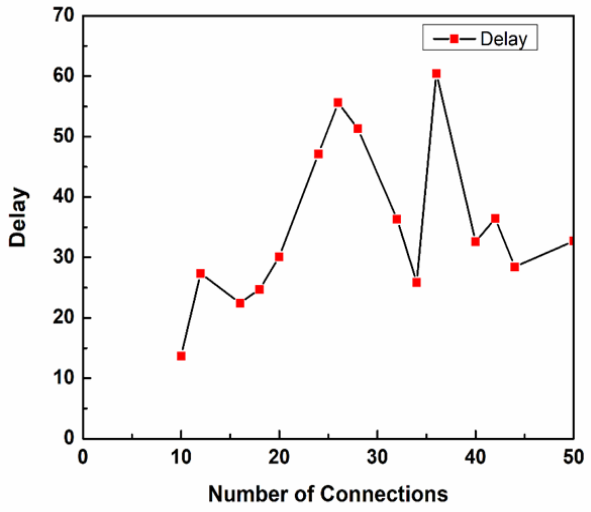

Fig.3. Delay performance with respect to number of connections

Fig.3 shows the plotted graph of one of the examples of the delay performance parameter obtained from the NS2.34 simulators. The delay can be seen more for almost 40 connection whereas using the algorithm the delay has been reduced for further connections. To achieve low delay the adhoc network and mobility handover protocol has been applied between maximum routing connections.

Comparative analysis

There are many existing methods and techniques to understand and improve the seamless mobility connectivity in different network. The most important requirement for any users of any network is to receive the connectivity with minimal cost, delay and packet loss. For understanding the broader way of this proper concept, we have compared different techniques used to fulfil same purpose. Sridhar et. al., (2017) explained and defined the techniques called Quadratic Lyapunov for accessing multiple routers simultaneously for seamless mobility which was applicable for personal area network [16]. The results achieved in the particular studies narrated the rate of packet loss with respect to the size of data packet. The overall study used three important techniques SI-QLMAR, e-SMIPv6 and SMH. The results also claimed that the rate of packet loss and delay is minimal when SI-QLMAR scheme used in comparison to other techniques. In comparison to other methods SI-QLMR reduces the packet loss up to 43%. But the drawback of respective studies was that the packet loss and delay were increased when size of packet data increases.

In another study Sridhar et al., (2017) compares the performance analysis of seamless mobility by using e-SMIPv6 and Seamless Mobility Handover (SMH) techniques [4]. The previous studies on e-SMIPv6 clearly demonstrated that, it is quite difficult to control cost, delay and packet loss by using this technique. The results of this particular studies explained that the use of SMH techniques reduces the data transmission delay within the personal area networks (PAN). But again, due to the high consumption of energy by SMH techniques the results obtained was not effective enough to implement practically. The results obtained from the particular studies shows that the SMH technique is 10-20% more efficient than e-SMIPv6 techniques.

Similarly, another researcher Nikam et. al., (2016), reported the delay performance analysis on Ad-hoc network by using NS2.34 techniques [17]. The delay performance in this research work is measured with the scenario of low and high mobility by varying parameters. The results of this work are based on the analysis of DSDV routing protocol in Ad-hoc network. It was observed from the various experimental studies done by the researcher that the delay can be depended on variable parameters such as speed and number of junctions. The results also explained that the minimal delay can be achieved by following the high mobility with less

junction. But still the results of this studies show the consistent increase in delay with the number of connections which was not controlled.

Therefore, after understanding the challenges from the previous studies, the current proposed research work used NS2.34 techniques to control the delay, cost and packet loss in WPAN network. After results analysis of the present methods, we have overcome many challenges faced by the previous researcher. The proposed method clearly defines the delay of mobility handover can be controlled at any time and at any node. The delay of-course is dependent of the number of junctions but can be controlled by this proposed technique. The efficiency to get minimal delay by using this technique is more than the 50% which is excellent than all the previously reported results

Conclusions

The detailed studies regarding delay reduction in seamless mobility has been done in the present research work. The suggested protocols and seamless mobility techniques are compared and specifically considered with already available standard mobile protocols. The most important concern regarding the mobility of networks is unavailability of sufficient simulation tools. This is due to the characteristics conflict between network mobility and NS2 simulation methods. This paper is purely concentrated and conducted the simulation tests to understand the delay of Seamless network which is an important characteristic to decide the performance of the network. The results obtained from NS2.34 simulation represents that the seamless mobility has much better performance in view of total delay handover, efficient bandwidth and loss of packets. The results also suggested that the less mobility concept will also help to maintain the average delay. The less delay can also be maintained by maintaining minimum number of nodes or junctions between base junction and site.

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