Remodeling Of Location Manager For The Packet Transfer In Repetitive IP Stations For Short Period Of Time

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Abstract

LEO satellites have important advantages over geostationary satellites such as low power requirements, low propagation delay and more efficient spectrum delay. However, the handover management in LEO satellites become challenging for supporting global mobile communication. Here we propose the remodeling of location manager which will reduce the space occupied and hence the binding updates and the packet losses during communication. It is the most efficient process when the previous ip addresses are repeated for several times during a short span.

Index Terms: handover, location manager, satellite networks, binding update

1. Introduction

In order to provide global coverage to a heterogeneously distributed population, satellite communications networks are utilized to co exist with terrestrial networks. A LEO satellite takes about 100 minutes to orbit the earth, which means that a single satellite is "in view" of ground equipment for only a few minutes [1]. As a consequence, if a transmission takes a longer time period than the time period for which any one satellite is in view, a LEO satellite system must hand over between satellites to complete the transmission. In general, this can be accomplished by constantly relaying signals between the satellite and various ground stations, or by inter communication between the satellites themselves using "inter-satellite links"(ISLs) [1], [2]. LEO satellites are also designed to have more than one satellite in view from any spot on the earth at any given time, minimizing the possibility that the network will lose the transmission. Due to the fast-flying satellites, LEO systems must incorporate complicated tracking and switching equipment to maintain consistent service coverage. In this paper, we focus on the handover management of satellite networks, which is a crucial design problem for supporting mobile communication services in the co-existing terrestrial and LEO satellite networks.

One of the proposed models for handover management in satellite networks is mobile IP (MIP) [3]. When a mobile host moves from one point of attachment to another it enables a TCP connection to remain alive and to continue receiving packets. Although MIP is a widely used approach applied to satellite networks, it has some important drawbacks including high handover latency and high packet loss [4] [5].

In our paper we have proposed an idea of reducing binding updates, handover latency and packet loss during handover. Our paper is structured as follows: In the first section we have given a brief introduction related to LEO satellite and handover mechanisms. In section 2 we have discussed the related work regarding MIP network. In next section we have proposed our idea of introducing a location manager .In section 4 & 5 we have shown the simulation results and the conclusion and the future work regarding this paper.

2.Related Work

Mobile Mobility Management

The main concern of mobility management is to locate MNs in the network and to guarantee seamless data transmission upon change in node position. Mobility management basically contains two operations, namely binding update and data delivery. The binding update operation aims to associate reach ability identity (Reach.ID) and routing identity (Route.ID) of each node [6] [7]. The Reach.ID indicates a unique name of the node and is not subject to change, whereas the Route.ID specifies the position of the node in the network and changes in response to node movement. When a mobile node changes its position, the Route.ID changes as well and the old binding is no longer valid. To update the binding, mobile nodes are requested to send their new Route.ID to the location directory (LD) [8]. The main problem of this procedure arises when LD is geographically too far from mobile nodes. In this case, the cost of binding update becomes very expensive, especially in a high mobility environment such as satellite networks [9]. Although a handover is a local process that concerns only the MN, the old AR, and the new AR, a binding update is a global process hat may affect other network elements in addition to the three adjacent entities. Route.ID can be used to indicate the position of the MN; therefore, no further operation is needed to do data transmission seamlessly. However, using Route.ID as the precise location of the MN requires frequent update of MNs registration even upon a slight movement of the nodes. Thus, the required update cost can be very huge [10].On the other hand, when Route.ID is used to indicate location of the MN roughly, an additional operation called paging is needed to find precise position of the MN. However, the paging cost can be very high in case of wide paging areas. As a result, Route.ID has a significant importance on the mobility management cost. The role of the Route.ID should be chosen carefully according to mobility management issues of the underlying network.

Mobility Management in Terrestrial Mobile Networks

In terrestrial IP networks, IP addresses are designed for Route.IDs and are also used as Reach.IDs in higher layers. This causes an important problem for mobility management

MN cannot be identified in the higher layers when its IP address changes after handover. The most dominant protocol among existing mobility management

protocols are MIP that was proposed to solve this problem by using two different IP addresses for the two locations of MNs. First location is called as home network and identified by home address which serves as a Reach.ID. Second location is visiting network and identified by care of address (CoA) which functions as a Route.ID. In this protocol, locations of MNs are precisely managed by binding update for every handover occurrence. The details of MIP and its drawbacks will be discussed in the remainder of this section.

Also, there are other mobility management protocols such as paging mobile IP (P-MIP) [11] and cellular IP [12] which are based on the principle of loose location management of idle nodes. In lose location management, location management is

done for only idle nodes. When idle node becomes active, paging is usually used for locating the node in the network. Lose location management protocols have not covered here.

Mobility Management in LEO Satellite Networks

The most widely used protocol for mobility management over satellite networks is again mobile IP proposed by the Internet engineering task force (IETF) to handle

mobility of Internet hosts for mobile data communications [13].

The MIP enables IP host mobility without breaking the high level connection. It enables a TCP connection to remain alive and to continue receiving packets when an MN moves from one point of attachment to another. MIP is based on the concept of home agent (HA) and foreign agent (FA) for routing of packets from one point of attachment to the next. During handover from the HA to the FA, a MN registers with the FA, waits for the allocation of channels, and updates its location in the HA database. The traffic flow of MIP is depicted in Fig. 1.

When MN moves to a new domain, a location update is sent to HA. Therefore, the HA is informed by the CoA of the MN. The packets from the CN to MN are encapsulated and forwarded to MN's current CoA. These packets are then encapsulated and delivered to upper layer protocols.Although MIP is a widely accepted concept, it has some drawbacks like **1. High Handover Latency**: A MN needs to wait for completion of the steps, which are discovering the new CoA, registering the new CoA with the HA (*binding update*), and forwarding packets from the HA to the current CoA, before it can

receive forwarded data from the previous point of attachment. Since the frequency of handover occurrences in LEO satellite networks is very high, a large number of binding update requests is likely to be generated in a single burst.

2. **High Packet Lost Rate:** This is another drawback of the MIP. During the HA registration period, some or all of the packets directed to the MN's old CoA will be lost because the old point of attachment does not know the new point of attachment of the MN so that it cannot communicate with the MN during this period.

3. **Inefficient Routing Path:** Since large amount of data is routed to the HA and then tunneled to the MN, it may decrease the scalability issues as the number of MNs managed by a HA increases.

4. **Conflicts with network security solutions :** The MIP *conflicts with network security solutions* such as ingress filtering and firewalls. It is hard to duplicate HA to various locations to increase survivability and manageability since HA must reside in MN's home network. Therefore, this model needs some modifications to be applicable to internet infrastructure.

In [14] there a location manager based system has been discussed for repetitive ips but it also have some drawbacks like it occupies more space and binding updates can be more.

Hence we have tried to solve these problems in our proposed work.

3.PROPOSED WORK

For the repetitive IP stations in[]location manager will store the IP addresses for a limited time and if the satellite goes to the previous footprint again, it has no need to register; the previous IP address will be assigned to it. This will reduce the binding update and also the handover latency for the Mobile IP network. But it has some drawbacks like it takes a huge space to store the IPs.So the efficiency can be reduced. Here we have remodelled the Location Manager. **We have designed it such that at first the satellite checks the IP addresses one by one, eventually storing only the first ip address and second ip address. The 1st IP is checked and then**

check the next two IPs to send the packets. If they are one of them keep that ip stored and replace the other IP.Thus this ensures that extra space is not occupied and hence the space problem can be minimized.

Algorithm

1. Location Manager is enabled
2. It stores the first and second destination IPs where the packets are to be sent.
3. While sending the packet, it will analyze the next two IPs where the packets are to be sent.
4. If any of them is the same as the previous one it will keep the IP and the others will not be stored.
5. The packet transfer will go on like this.

Here the location manager is only used to store the similar IPs and discard the different IPs.

The advantages of this location manager are

i. It will update itself after a certain time and the IPs will be matched according to the stored IPs.

ii. The space occupied will be less

It has also some disadvantages like :

i. It cannot trace the previous IPs after it is updated.

4. SIMULATION RESULT

In the simulation part we have compared our proposed algorithm with the existing procedure related to the handover of the Mobile IP network mainly with the LM based one. We have basically done two simulations here. First one is based on packet loss, second one is handoff latency. The results have been shown as follows:

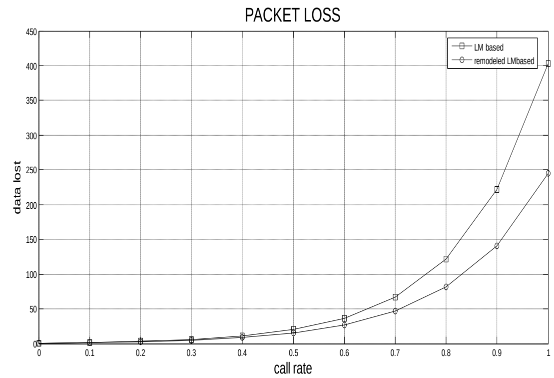

Fig1.Packet loss

From the simulation results we can find it out that if LM based MIP is used it will reduce the data loss shown in above figure.

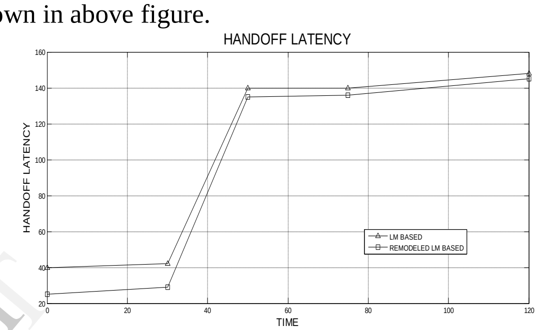

Fig2.Handoff latency

From the simulation results we can find it out that if LM based MIP is used it will reduce the binding update, space and hence the handover latency shown in above figure.

5. Conclusion

In this paper we have discussed the remodelling of Location Manager and also its algorithm to reduce the problem regarding the space occupied by stored address content. It is mainly related to Mobile IP network and basically it is designed to solve the handover latency binding update cost and other cost for repetitive ip stations. We have shown by simulation that our work is effective and it can also have a better implementation in future.

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http://www.ijcaonline.org/archives/volume37/number7/4621

ISSN: 2278-0181
Vol. 2 Issue 7, July - 2013

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