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Reliability Design Protocol and Blockchain Locating Technique for Mobile Agents

Ms. Priyanka Kaushik[1]* Dr. Rajeev Yadav[2]

[1] Assistant Professor, NIMS University, Jaipur, India

[2] Professor, OPJS University, Churu, Rajasthan

Abstract – The reliability design and location protocol management of the Mobile Agent and its current updated Location and maintenance in the mobile database and its reliability design are the current issues in a distributed technology. It still represents an open research area. . This paper analyses the new locating management schemes and reliabilities of IOT with the block chain and graph theory concept and probability reliability design which will make some difference in heterogeneous networks. In this work, a deployment of four types of locators protocols are proposed for optimal and fault tolerant free location management techniques through mobile agents such as POSBL, CSHBL, CICBL ,UZL and sub locators chain as IZHSL, IZOSL, IZICL. The theoretical model of graph theory optimization technique is used for optimal throughput of updated LA (location area) which is residing under the structure of BA and MSC. To achieve the reliability design the theoretical method of max-flow min-cut algorithm approach is proposed. A simulation is performed and the result of location updates through deployment of locators is achieved.

Keywords – Block Chain, Mobile Agent, Mobile Switching Centre, Location Management, Max-Flow Min-Cut Algorithm, Ad-Hoc Network, Reliability

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I. INTRODUCTION

Mobile agents are autonomous software processes capable of migrating from one network to another. They have receive much attention in the last few years because of their advantages in accessing distributed resources in a low bandwidth network and they are used to developed a new approach for collecting subscriber information on the terminal side in mobile communication networks the reliability of the agent and distributed wireless communication network may affect the performance of location strategy of mobile agent system.[1] Computer network contains a collection of machine intended for running user applications. These machines are called hosts all the host that are far away from home and want to be in connection with main host machine are known as mobile host .in distributed network there are one or more foreign agents which are processes that keep track of all mobile host by locating and accessing their tracks of visits (both of current area as well as of host). The agent's main function is to keep track of the location of subscribers or users who are continuously moving from one station to another.

II. TOOLS FOR LOCATING MOBILE AGENTS

To locate the mobile agent the location management and its scheme play a great role. There is a requirement of an efficient mobility management for locating Mobile Agents.

The basic operations associated with mobility management are:

A. A roaming agent updates its location frequently to the central management server, that is, a directory server

B. The agent management server refreshes the current location record of the agent in its location database.

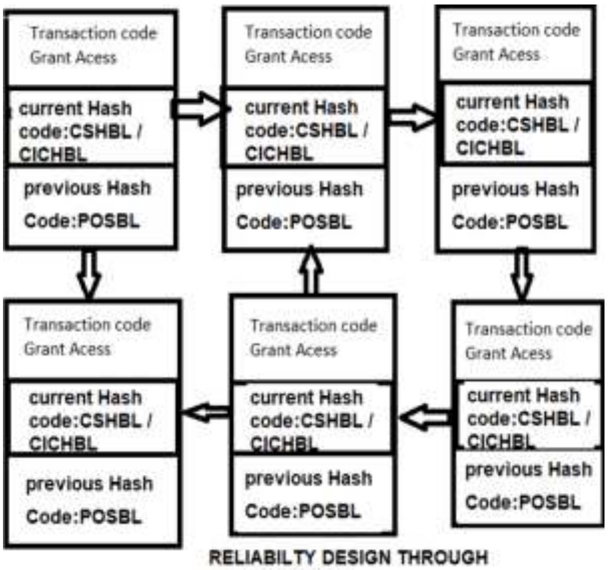
C. When there is a request asking for the location of the agent, the management server searches the database and replies with the current location of the Mobile Agent. It is very important to understand the meaning of Location Management in Cellular Networks and in Adhoc networks. .[2] It is achieved by Location Updates and various Location Management schemes. There are also some common assumptions for performance evaluation for locating a mobile agent.

III. RELIABILITY DESIGN THROUGH BLOCK CHAIN

Block chains are distributed networks that can have millions of users all over the world. Every user can add information to the blockchain and all data in the blockchain is secured through cryptography. Every other member of the network is responsible for verifying that the data being added to the blockchain is real. This is done using a system of three keys (private, public, and the receiver's key) that allow members to check the veracity of the data while also confirming who it comes from.

A verified piece of data forms a block which then has to be added to the chain. To do this, blockchain users have to use their respective keys and powerful computing systems to run algorithms that solve very complex mathematical problems. When a problem is solved, the block is added to the chain and the data it contains exists on the network forever, meaning that it cannot be altered or removed.

In order to make updates to a particular piece of data, the owner of that data must add a new block on top of the previous block, creating a very specific chain of code. If anything, even something as small as a comma, gets altered from how it appears in a previous block, the entire chain across the network also changes accordingly. This means that every single alteration or change to any piece of data is tracked and absolutely no data is lost or deleted because users can always look at previous versions of a block to identify what is different in the latest version. Using this thorough form of record-keeping makes it easy for the system to detect blocks that have incorrect or false data, preventing loss, damage, and corruption.



RELIABILTY DESIGN THROUGH BLOCK CHAIN FIG 1

Even to use the block chain concept in mobile computing first of all maximum flow coverage is required for the networking area. Which can be covered with the max-flow min-cut algorithm problem.

A. Algorithn for generating the block chain and tackles the delicacy issue.

```
//initializing maximum network flow zero
flow = 0
//block will be created
for each hashedge (u, v) in B:
    flow(u, v) = 0
while there is a path, p, from s -> t in residual network B_f:
 residual_capacity(p) = min(residual_capacity(u v) : for (u, v)
in p)
    flow = flow + residual_capacity(p)
// if block data is manipulated it will be terminated further
    for each edge (u, v) in p:
        if (u, v) is a forward hashedge:
            flow(u, v) = flow(u, v) + residual_capacity(p)
//original block will be restore
        else:
            flow(u, v) = flow(u, v) - residual_capacity(p)
// new Chain created
return flow
```

IV. LOCATING BLOCK CHAIN FROM LOCATION AREA FOR THE RELIABILITY ISSUE

One of the main difficulties introduced by mobile networks, compared to public switching networks, is the fact that mobile stations (MS) have no permanent connection to the mobile network. For this reason the network has to track the position of a mobile subscriber. This is why so called location areas (LA) are introduced.

Cellular network, a service coverage area is divided into smaller hexagonal areas referred to as cells. Each cell is served by a base station. The base station is fixed. It is able to communicate with mobile stations.[3]The base station is verified and a piece of data forms a block which then has to be added to the chain. To do this, blockchain users have to use their respective keys and powerful computing systems to run algorithms that solve very complex mathematical problems. When a problem is solved, the block is added to the chain and the data it contains exists on the network forever, meaning that it cannot be altered or removed.

A location area is a geographic area covered by base stations belonging to the same group. The identity of the location area a cell belongs to is sent in the cell on a broadcast channel, thus enabling mobile stations to be informed about the location area they are in. Location management schemes [40] are essentially based on MS mobility and incoming call rate characteristics. The network mobility paradigm exhibits a strong antagonism between locating and paging. The locating procedure provides the network with the initial information (i.e. the Location Area) about a MS location. The paging procedure results in the exact MS location information i.e. the Base Station to which the subscriber is connected. Within the same LA, the MS may roam between different base stations (e.g. cells) of this area without initiating a location update. Location update occurs every time the MS crosses a LA border.

An LA consists of one or more cells. Paging is used to determine the cell or block in which the MS is located. Paging includes sending paging messages to all cells of the location area. With a high number of cells or blocks the paging cost can be very high[4]. On the other hand, a high number of cells per LA also mean that LAs are big so that the location update cost is low, since the MS will less often cross a LA border. The locating procedure brings the MS service profile near its location and allows the network to rapidly provide the user with the required service.

Each cell has one Base Station (BS) representing the connection point for MSs to the network. Several BSs may be grouped together under the control of a Base Station Controller (BSC). In turn, several BSCs are usually controlled by a mobile switching centre.[5]

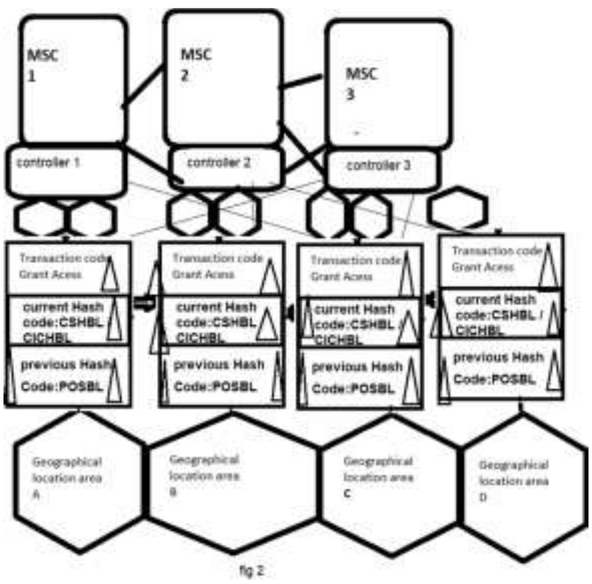


fig 2

V. DEPLOYMENTS OF BLOCK LOCATORS

For incoming calls the mobile network has to locate the called MS by paging.

In current approaches this problem is solved by introducing pointer locators. Functionally, there are four types of locators:

A. Current Hash State blocks Locator (CHSBL) where all subscriber parameters of the MS are permanently stored and subscribers basically belong to this base station. It includes sub locator i.e. Inner Zone Home State Locator (IZHSL).

B. Previous Hash Other State Block Locator (POSBL) where all subscriber parameters of the MS are temporary stored where all relevant data concerning a MS are stored as long as the MS is within the area controlled by the OSL .It include sub locator i.e. Inner Zone Other State Locator (IZOSL).

C. Current International country block Locator (CICBL) where all subscriber parameters of the MS are temporary stored where all relevant data concerning a MS are stored as long as the MS is within the area controlled by the ICL. It includes sub locator i.e. Inner Zone International country Locator (IZICL).

Unknown Hash Zone Block Locator (UHZBL) when all subscriber parameters of the MS are unable to locate the zone location then this type of locator occurs and it is difficult to identify the location in this.

The whole area (Roaming area) in which the network enables MSs to connect to it, is divided into several Location Area (LA, see Figure 4). One or more LAs are allocated to a particular OSL or ICL that records all subscribers within these LAs. If the subscriber is moving to a LA allocated to a different POSBL or CICBL, the new POSBL or CICBL will record the newcomer and report the change of LA (i.e. POSBL or CICBL) to the CHSBL to which the subscriber is assigned. This procedure is called location update. Location updates store the current subscriber's LA in the POSBL or CICBL.

Depending on the relationship between the old and the new LA, Four cases of location updates can be distinguished:

[a] Location updates occurring in the same POSBL, IZOSL or CICBL, IZICL area.

[b] Location updates between two POSBL or CICBL areas, within the reach of the same MSC.

[c] Location updates between two POSBL and CICBL areas are allocated to different MSCs.

[d] Location updates occurring in the IZHSL area.

VI. ANALYTICAL COLOURING TECHNIQUE MODEL FOR IDENTIFYING MANIPULATED

Colouring technique is an important tool of graph theory it is used to do distinguish between different nodes, especially between the adjacent nodes. . [6]

In this Work, m-colourability optimization technique is proposed for main Locators (i.e. CHSBL, POSBL or CICBL, figure5). And next value varying 2-way colouring reporting technique is proposed for sub locators (i.e. IZHSL, IZOSL, IZICL, figure 5).

B. Algorithm m-colourability optimization technique is proposed for main Locators (i.e. CHSBL, POSBL, CICBL).

{
Repeat
{ if x[c] = 0 then return*//no block created*
{for c:=1 to n
{if x[c] != 0 and (c = m)*// block created with the use of mobile computing and networking*

{for i:=1 to n
{if x[id no] = x[i] *// detect the geographical location area if it match with CHSBL*
x[c]= col1 } *//assign color1 to CHSBL*

else if
for j:=1 to n
{ if x[id no] = x[j] *// b*

{ if x[id no] = x[j] *// b detect the geographical location area if it match with POSBL*
x[c]= col2 }*// assign color2 to*
elseif

for k:=1 to n
{ if x[id no] = x[k] *// blockchain call detect the geographical location area if it match with CICBL*
x[c]= col3*//assign color3 to CICBL*

else
x[c]= 0 }*// case of Unknown geographical area UZL*}
until (false) }

{ *//check if previous call and latest call are assign various different colors for ex previous call always assign color1 and current call always assign color2*

//IC = incoming call//b
If ((IC [c, j] != 0 and x[c] = x[j] *//block chain created with current hash*

X[c]= col1// assign color 1
X[Loc]=id[c] }
Else if x[c] = x [j++]
{ X[c] = col2 *// x[j] previous hash maintained in block*

assign col1 n vary to col2

X[c] = x[j+1]
X[c]= *col1 //each time new Block chain created arrive it will //assign col1and previous one vary it color back to col2 so that location of new chain is always detected.*

X[Loc]=id[c]
break;}

Print X[Loc] *//current update location* }

Until (false) }

Table I: Simulated Data by Using Locators

Locator	Location update Overhead		
	Traffic generated by LU	Messages /Block chain detectl rate	Bytes
POSBL	In the same POSBL or sub locator i.e IZOSL	15	402
CHSBL	In the same CHSBL or sub locator i.e IZHSL	36	1307
POSBL	In the different POSBL	8	215
CICBL	In the same CICBL or sub locator i.e IZICL	10	289
CICBL	In the different CICBL	5	122

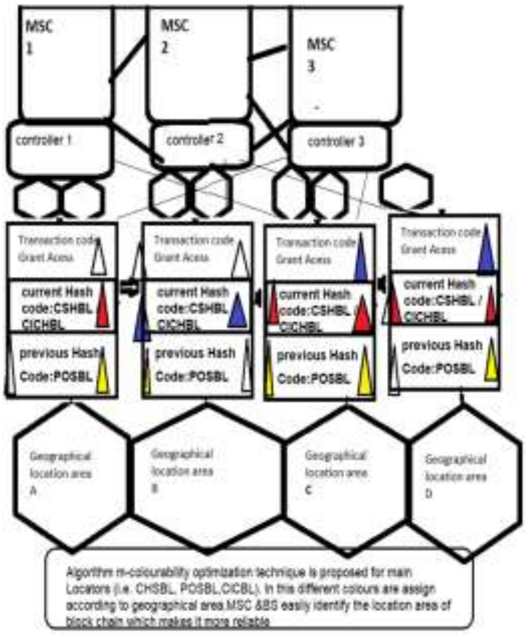


Fig 3

VII. SIMULATING LOCATORS THROUGH COLOURING TECHNIQUE MODEL

The number of messages (i.e. bytes) exchanged at each interface in the location update processes for GSM are shown in Table 1. Particularly in highly urban spots or in POSBL and CICBL, where the location areas are relatively small, Many open distributed systems, alike a mobile agent system may fail due to two reasons: site failure and communication failure, there can be two different consequences. If the mobile agent is not residing on the failing site, the mobile agents keep alive with its state. However, if the failing site is one of the destinations of the agent.[10] the agent must reroute its itinerary. If the mobile agent is residing on the failing side, the mobile agent will be lost. The state of the agent and computation result will also be lost. Persistence of agents is an issue specific to the mobile agent system. However, there are not many new challenges, and existing techniques like logging, check-point, and transaction processing may be directly applied .[11] In case of communication failure, the mobile agent must be informed of the failure, and it must be able to reroute its itinerary. Otherwise, it will wait indefinitely for the failed communication link to recover, and the system will be virtually dead. In short, agent persistence and agent rerouting are two of the new challenges that mobile agent systems bring to reliability research.

VIII. CONCLUSIONS

In this work , a deployment of four type of locators are proposed for optimal and fault tolerant free location management technique through mobile agent such as CHSBL, POSBL, CICBL ,UZL and sub locators as IZHSL, IZOSL, IZICL.

The theoretical model of m-colourability optimization technique and next value varying 2-way colouring reporting technique are used for optimal throughput of update LA(location area) which are residing under the structure of BA and MSC. And for movement based mobility management Bellman Ford technique is used.

For the proper and smooth functionality of the mobile computing the reliability design and fault free wireless environment is very essential and one can achieve the aim of locating mobile agent only through reliable fault free functionality. So, to achieve the reliability design the theoretical method of max-flow min-cut algorithm approach is proposed.

A simulation is performed and the result of location updates through deployment of locators is achieved.

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Corresponding Author

Ms. Priyanka Kaushik*

Assistant Professor, NIMS University, Jaipur, India

kaushik.priyanka17@gmail.com