



## RFID Mobile Agent - Decentralized Middleware Task Allocation in Distributed Systems

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**Abstract**— *In this paper, we are discussing about the decentralized middleware task allocation in distributing system environment using the RFID Mobile agent. The proposed system states that, the dependent centralized task allocation system can be converted into independent decentralized distributed systems. This system provides a security for RFID mobile agent nodes from external threats or any antibodies. If any node in the environment detects any threats, automatically it will transfer the data to neighbour node using mobile agent in a cipher text form.*

**Keywords**—*decentralized; RFID; mobile agent; security tag; middleware; Encryption;*

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### I. INTRODUCTION

In past days, the allocation of work in organization is extremely difficult to maintain and monitor the task. However, in regimented, unstructured, unpredictable environments task execution needs to have definite flexibility. To solve this problem, such flexibility, independent and hardness are the key benefits for the decentralised control of mobile agent. Previous research paper deliberates that task allocation is very difficult to distribute. The task allocation is dynamic in the existing system, it causes problem in the performance and maintenance. To overcome this problem they introduced middleware to allocate the task in distributed system using the RFID mobile agent. Furthermore agents can easily communicate and interact with each other. The aim of forming an overall architecture that ultimately delivers a particular task allocated to specific users in the easiest way. Another advanced enabling near field communication technology is used in industries, companies to identify unique objects, communicate, educate, collaborate and distribute products is the RFID (Radio Frequency Identification) [5]. It store a small amount of information and it can change the information dynamically. It does not need any power supply for communication. RFID technologies are used to track shipments, security, access control and payment systems including an advanced communication middleware. It is general for similar systems to be promoted for user authentication and verification of unique objects [5]. Further, RFID are used for decentralize purposes in regimented environments where the location can be change continuously and many more objects / resources may move and may vary from physical structure [4]. In a prominent computing technology, mobile information systems are strongly associated with task execution and communication. In a software information system, the tasks may operate and performed well in a variety of locations. They may be affecting the task and it can be executed. The emerging technology of distributed and mobile information system is a continuous development in size, power and communication technology. The system issue is measured such as changeable of location and behaviour of system may act differently in different locations to reach its goal. The Proposed research, nowadays in structured organization, we have seen a rapid increase in distributed system for parallel processing. Mobile agents play a vital role in the distributed environment. The goal of this paper is to develop a middleware for task allocation aiming at the distributed systems in a decentralised environment and to provide a security for the RFID Tag. The system is distributed randomly which involves different types of resources and nodes, acts as agents. The available resources and nodes will distribute the data to other neighbouring node using Middleware agent. Each node has a different key for authentication. If there are any threats from the external resource or any Anti-Bodies will provide a security in a decentralised environment.

This RFID tag, used in decentralized environment and distributed information in the scope of the middleware performing the task allocation. It is works based on the "Navigation Graph" [4]. Each RFID tags contains the information about the neighbouring RFID tags for the navigation. This paper delivers as follows, Section 2: Theoretical Background describes about the architecture of the existing system, Section 3: Research Results, presents the study case of our proposed system, Section 4: Reflection of our System, says that the virtual implementation, and finally conclusion in Section 5.

### II. BACK GROUND

In previous research impacts that allocation of task is very difficult to execute parallel in an organization. In an ideal situation task allocation is dynamic, unstructured, and unpredictable in nature to overcome this, they introduced middleware to allocate the task in distributed system using the RFID mobile agent [4]. The System is physically distributed; it involves different types of resources and actors as human, robot, and chairs etc., as an agent. The employer's task can be allocated by the set of variable nodes and resources can be executed in specific location.

The overall research demonstrates the implementation of task allocation middleware in the hospital environment. The tasks include i) to clean hospital areas 2) identify the objects [4]. The task to be submitted and monitored by the task location middle ware server. This task to be accomplished to discover and invoke web services by interacting as neighbour agents in the web based GUI environment. In this case task failures occur only at services at the software level and security.

### III. RESEARCH RESULT

#### Decentralized environment:

According to the research result decentralized environment is mainly used in the security aspects. The main characteristics of the decentralized system is fault tolerance, online maintenance [3]. Decentralized environment mainly distributes the functions and power form the centralized location. In the decentralized environment we are introducing the mobile agents for allocating the tasks using RIFD According to this research paper, they have created a centralized infrastructure for the task allocation of the system using RFID, the results states that the proposed system can develop this infrastructure into the decentralized one, by doing this to improvise in the security aspects. The other benefits of this infrastructure are less maintainability and scalability.

RFID is a radio frequency identification is used in the mobile agents used for the short distance communication (i.e.) data transfer. RFID architecture mainly consists of tag, reader and backend system. Tag is nothing but the physical objects, reader is known as (data- read/write) and backend system (database services). RFID tags are mainly performing by the help of the identifier and tuple.

Tuple can be divided into categories, class, properties. Each category can be divided into Thing category, node category and task category.

RFID needs a Middleware to function. On the basis of the middleware algorithm only the communication of the RFID chip is designed. Middleware applications are demonstrates in the reflection of results. Middleware is placed in between operating system and the distributed application. It gives communication between the operating system and programming language. Mainly used for remote calls and object invoking.

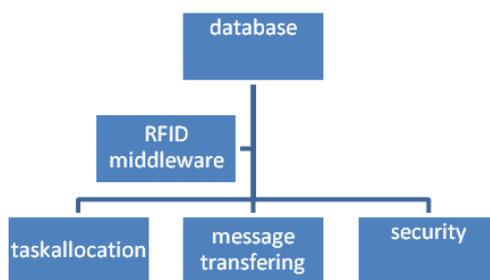


Figure1: layout diagram of RFID Middleware

In this diagram, RFID performs various functions according to the middleware algorithm for example task allocation, message passing and security.

#### IV. REFLECTION OF THE SYSTEM

In this section, proposed model design for decentralized middleware task allocation using RFID nodes with security. A specific task allocation model can deployed in the environment of shopping mall.

First, considered the task includes i). *To clean the floor* ii). *to check the fire extinguisher* iii) *to check the escalator, lift*. Second, to setup the RFID tag into the shopping mall environment as shown in the figure 2, to implant the RFID tag into nodes like humans, and objects (fire extinguisher, lift, etc.)

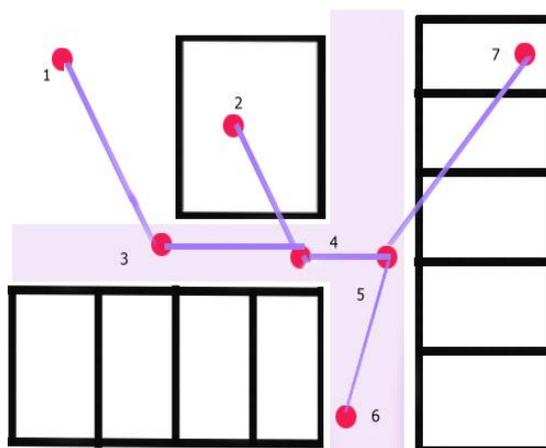


Figure 2. RFID mobile agent node shopping mall

Third, using the middleware application to allocating the task, clean the floor on level 1 and check the fire extinguisher is working or not. For example, a task that to clean the floor in front of room no 12, task to submitted to the neighbour node by invoking the service,

- Node 4 is in first level which is human node
- Node 7 is inside room no 12 (needs to clean floor in front of this room)
- Neighbour node 5 which is task allocating node to node 4 to do the task, which is allocating by using the middle ware node
- Node 5 is computer node called mobile agent.

All node is independent because task is working under the decentralized environment which contains information about neighbour node .it can be classified on the basis of distance and human nodes or computer nodes

For example, node 1 contains all the information about the nodes of 2, 5, 4 based on the tuples categories.

Fourth, In the Security aspect, every node contains key for authenticate to valid tag or not

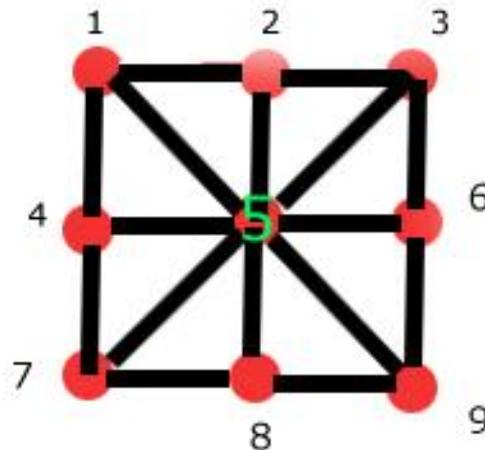


Figure 3. Middleware agent computer node

Node 5 transmitting key to node7 in the open environment it may be attack by eavesdropper [1]

Based upon the Secret sharing scheme (SSS) which was proposed by Shamir [1] and Blakley [2]. Transmitting the key into two different neighbour node to get back the instant key from that two nodes, that instant key is used for checking valid tag or not .

n piece of identifier key, k neighbouring nodes share (k, n) threshold scheme according to the shamir secret shared scheme [1]. S is the user key, x neighbour node

Equation:

$$f(x) = S + a_1 X + a_2 x^2 + \dots + a_{k-1} x^{k-1} \text{ mod } q$$

Where  $q \geq \max(n, s)$  and  $a_i$  are random integer depends on k [1].

F(x) matches the neighbour nodes if it same it's valid or not valid

For example, node 5 transmit the user's key to Node 7 to check valid or not at that time node 7 acquires the RFID identifier secret key of node 5 and node 7 which is neighbour node At node 7 after executing the algorithm of Shamir [1] and blakley [2] provide instant key to node 5 if it is valid it will provide or otherwise block that node and transfer the information to another node

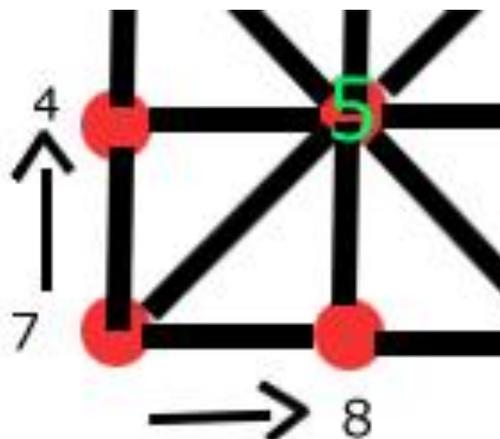


Figure 4. Data transfer to neighbour node

If it's not a valid node its automatically transfer the information to neighbour node for saved the information from the invalid node called intruder. for example, node 5 is trying to allocate the task to node 7 if it is invalid tag at last no node 7 distribute the information of own to be neighbour node.

## V. CONCLUSION

This research paper states that functionality of RFID using Mobile agent in the Decentralized environment, till now the proposed system mainly concentrated in providing the security for the tags and task allocation. In future, this system can be enhanced by adding additional features. It providing security for the data transfers in the various node. It can be improvise in this way, during data transferring the plain text can be converted into cipher text while sending from one node to another node, to provide the specified encryption standard and to change the cipher text into plain text at the receiving node by the authenticated person. This will be one of the safest data transferring system in the decentralized environment.

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