Modelling Efficient Process Oriented Architecture for Secure Mobile Commerce Using Hybrid Routing Protocol in Mobile Adhoc Network

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***Abstract*— The proposed research work presents a novel approach of process oriented architecture for secure mobile commerce framework using uniquely designed hybrid mobile adhoc routing protocols using reactive and proactive type in real time test-bed. The research work discusses about deployment of mobile commerce which is one of the emerging trend in mobile applications with huge demands. Majority of the existing system lacks either QoS or efficient security protocol when it relates to secure mobile transaction due to the reason that development in wireless technology involved in m-commerce is still in its nascent stage. The real time test bed has been implemented with 20 Intel Atom processor with 32 bit OS establishing an adhoc network and by providing a random mobility to achieve any file type transfer from node to node. For the real-time set up purpose, the experiment is conducted in wireless infrastructure with mobility using G-based Linksys wireless router. Iteration of experiments conducted shows a satisfactory results. This research journal will provide insights with various parameters, security requirements, and concepts which is required in creating a robust model for secure m-commerce system.**

Keywords-m-Commerce, Mobile adhoc network, AODV, DSDV, online transaction

I. INTRODUCTION

The current research concern is to design an ideal application to facilitate and utilize mobile commerce on the go and mobile adhoc network can be the most preferred platform to design such application. But to best of our knowledge, the feasibility is still not confirmed in any prior research. Mobile adhoc network (MANET) is a network consisting of a collection of nodes capable of communicating with each other without any assistance from a network infrastructure. Applications of MANETs include the battlefield applications, rescue work, as well as civilian applications like an outdoor meeting, or an ad-hoc classroom. Several medium access control (MAC) protocols are used in wireless networks to manage the use of the wireless medium. M-commerce transactions can be performed over mobile adhoc networks or adhoc m-commerce which can be considered as wireless trading outside established computer networks [1]. Adhoc network is in constant use in the field of cost-effective communication. The utility of the adhoc wireless network is found to be effective enablers for engaging the clients in mobile commerce secure operations irrespective of time and location by making use of the wireless resources without any dependency for a network service provider. Along with the advantages, adhoc network also comes with lots of implementation challenges in its application. Recently, adhoc network has also been explored for mobile commerce application for easy communication system. Unfortunately, such types of networks are easily prone for serious network attacks, which make the client's private resources vulnerable. Therefore there is a huge requirement of guidelines for designing an analytical system which should assist to solve all the critical issues. The security issue which might be surfaced in the design of secure mobile commerce application will be inappropriate design of routing protocols in mobile adhoc network due to its dynamic topology and faster consumption of power in the mobile nodes which will render malicious activity to the client's device. Examples of such protocol will include the Bluetooth MAC layer protocol [2] and IEEE 802.11MAC layer protocol [3]. Because radio range is usually limited and the network components may have some mobility, the topology of a wireless network can vary with time. According to the relative mobility of hosts and routers, there are three different types of wireless networks e.g. Fixed wireless network [4], Wireless network with fixed access points [5], Mobile adhoc network [6]. Generally speaking, conventional routing protocols that are deployed in wired networks can only maintain routing in fixed wireless networks and mobile networks with fixed access points. Only one-hop routing is required over a link in a wireless network with fixed access points and many fixed wireless network [7]. The process of routing in mobile adhoc networks and certain fixed wireless networks exercise multiple-hop routing majorly [8]. Therefore the routing protocols for such types kind of wireless network should be able to maintain paths to other nodes and in

maximum cases, must tackle changes in paths due to mobility reasons. Conventional routing will not properly support routing in a MANET. Traditional routing protocols, such as Open Shortest Path First (OSPF) [9], can be deployed in some wireless networks with infrastructure. However, they cannot be directly employed to majority of MANETs since they are completely based on certain assumptions that will be only applicable in wired networks. A routing protocol may need to balance traffic based on the traffic load on links [10]. Scalability of routing protocols is an important issue for large networks [11]. The routing protocol may need to implement security to protect against attacks, such as sniffer, man-in-the-middle, or denial of service [12]. Researchers are designing new MANET routing protocols and comparing and improving existing MANET routing protocols before any routing protocols are standardized using simulations. The partial taxonomy of routing protocols in MANET is as shown below:

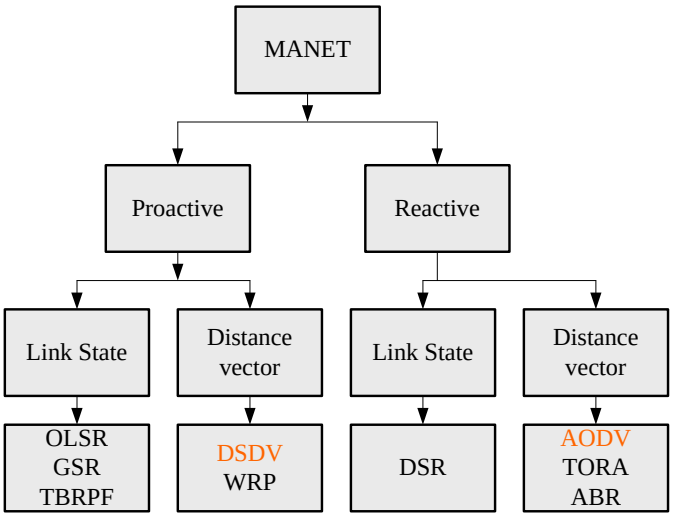

Fig.1. Partial Taxonomy of routing protocols in MANET

Also, it has been seen that the simulation results from different research groups are not consistent with each other [12]. This is because of a lack of consistency in MANET routing protocol models and application environments, including networking and user traffic profiles. Therefore results obtained by conducting experiments on routing protocol in simulations vary a lot in comparison to results obtained in real time scenario. Thus, the simulation scenarios will not be reasonable for all set of protocols and research implications cannot be generalized. Furthermore, it is most complicated for one to choose a proper routing protocol for a defined MANET application. The routing protocol is therefore desired to possess following individuality in order to be efficient: distributed operation, loop-freedom, demand-based operation, proactive operation, security, "sleep" period operation, unidirectional link support. [13].

Owing to the issues in difference in results in simulation and in real time approach which is a very challenging one, this research journal will highlight a novel approach of creating a real time design of process oriented architecture of mobile commerce application for mobility aware adhoc network using hybrid protocols. This process oriented architecture proposed in this research journal will also endeavor to highlight various security issues in mobile adhoc wireless mobile commerce system which will help the researchers for distinguishing various obstructions for solving such security issues in mobile commerce application. The main contribution of the research journal will be to create a categorization of various parameters identifying mobile commerce in mobile adhoc wireless network. All the operational parameters in mobile adhoc wireless mobile commerce will be identified. Any critical problems which may restrict the development of secure adhoc wireless mobile commerce system will also be focused.

In Section II, we will discuss about the previous research work in this area followed by Section III about mobile commerce system over wireless network. Section IV highlights about the feasible application for the proposed design work key issues followed by Problem Discussion in section V. In depth discussion of proposed system is done in section-VI followed by experimental set up in section-VII. Section VIII highlights the performance analysis of the conducted experiment followed by security requirement analyzation in section-IX and conclusion in section-X

II. RELATED WORK

Routing protocols for diverse types of wireless networks have been discussed by a number of researchers. [12] The literature related to routing schemes used in MANET is classified into three main categories of routing protocols-Proactive (table-driven) protocols, Reactive (source-initiated) protocols, and Hybrid protocols. Proactive routing protocols tend to keep an up-to-date topological map of the entire network. With this map, the route is known and immediately available when a packet needs to be sent. The approach is equivalent to the one used in wired IP networks. Example of proactive routing protocols are Destination-Sequenced Distance-Vector routing (DSDV) [14] protocol, Cluster head Gateway Switch Routing (CGSR), Optimized Link-State Routing Protocol (OLSR) [15], Wireless Routing protocol (WRP) [16]. In distinction to proactive routing, reactive routing does not attempt to continuously determine the network connectivity. Instead, a route determination procedure is invoked on demand when a packet needs to be forwarded. The technique relies on queries that are flooded throughout the network. Reactive route determination is used in the Temporally Ordered Routing Algorithm (TORA), the Dynamic Source Routing (DSR) [17] and the Ad-hoc On-demand Distance Vector (AODV) [18] protocols. Another type of routing scheme is Hybrid routing

which combines the best features of both proactive and reactive approaches. Examples of such kind of protocols are Zone Routing Protocol (ZRP) [19],[20], Distributed Dynamic Routing algorithm (DDR). The Zone Routing Protocol, as its name implies, is based on the concept of zones. A routing zone is defined for each node separately, and the zones of neighboring nodes overlap. The routing zone has a radius r expressed in hops. Cheng e.t. al [21] has highlighted the vulnerability of the famous AODV routing protocol in his recent work. Rakesh [22] has presented and examined analytical simulation results for the routing protocols DSR and TORA network performance, using the well known network simulator OPNET 10. 0. Shukla [23] presents a novel method to enhance route maintenance part of DSR protocol. Javad [24] has proposed an algorithm for multicast routing protocol in wireless adhoc network using learning automata. Rafael [25] presents a performance analysis of different mobile payment protocols. The performance analysis includes the computational cost required by each entity to perform all the cryptographic operations and the transmission time required to transmit each message. But the work did not considered analysis using mobile payment protocols using elliptical curve cryptography. Suresh Chari e.t. al. [26] have identified some frameworks and their inherent exposures in security issues in m-commerce. Alia Fourati [27] has worked on secure and fair auction over adhoc network. Even in this work also, some specific security issues to adhoc networks were not treated. Osman [28] presents a fully distributed and self-organizing approach to managing group membership in such a loose trading community. It is designed to suit the dynamic nature of ad hoc wireless networking and the social characteristics of ad hoc m-commerce.

Obviously it can be seen in this section of related work that majority of research work from old to recent has been performed either in programming simulation or in commercial simulators like NS-2, OMNet, or OPNET. Almost no reported significant research work being carried out in routing protocols enhancements in real-time test-bed. This research journal will focus on implementation and process design of hybrid routing protocols in considering real-time mobile nodes.

III. MOBILE COMMERCE SYSTEM

The adhoc mobile commerce takes place between multiple numbers of nodes which are in proximity of each other without relying on the services of any infrastructure [29] which is very different from infrastructure mobile commerce application. Such nodes can be termed as peer node which can cooperate and participate in communication process by using their normal local resources along with their neighbor's independent on any support provided by a network service provider in order to achieve the transaction or such related task. So, following are the inherent properties of mobile commerce in adhoc network:

- *Independent of Service Provider*: As the adhoc wireless network will not have a network service infrastructure and are self-organized, a dedicated service provider cannot be entrusted for allocation of maintenance task for enabling security parameters or payment scheme reliability for m-commerce applications.

- *Restricted Scope of Communication*: With various restriction in communication range especially in IEEE 802.11 [30] [31] [32] poses a challenges in adhoc networks where the network topology is normally dynamic rendering less trust on any third party service by communicating peer node to support security and/or payment in real-time application among the peers.

- *Inadequate online time*: Due to finite energy cycle and the dynamic topology of mobile devices as well as intermittent network disconnections [33], there is a restricted time during which these mobile devices can be online, which actually limits them from participating in lengthy and complex operation processes related to transactions [34]. This fact represents that complex secure operation in m-commerce need to be completed in a fairly short period and should only comprise a few simple stages if they are to have a good chance of success in terms of security.

- *Impulsive choice in Adhoc configurations*: As the adhoc wireless network has self-organizing attribute [33] which allows client that are equipped with mobile devices to instinctively participate in m-commerce transactions when the requirement arises while they are on the mobile mode.

- *Cost Effectiveness*: There is no extra complicated device [35] in mobile commerce application in order to perform security operations in m-commerce over an adhoc wireless network as peer nodes which will formulate the network.

- *Privacy*: The mobile commerce application enabled in adhoc wireless network is very much appropriate for maintaining or safeguarding the privacy protocol for commercial transactions where the clients (traders) will not look for disclosing the commercial transaction information to some external entities [36]. There is no third entity which needs to be involved in order to realize the network communication.

IV. APPLICATIONS

There is numerous distinctive variety of m-commerce secure transactional processes that can be conducted out over adhoc wireless networks:

- *Digital Resources Quality*: Exchange of digital contents such as music files, eBooks, videos, etc. For example, two peers' nodes who meet by chance at an terminal may be in agreement to exchange a digital contents for a specific reason.

- *Auction in M-Commerce*: An auction process [37] can be designed anywhere as soon as a group of at least three peer nodes with mobile devices and shared software are in mutual agreement to participate in trading process. Such type of activity is agreeable to short term involvement by peer nodes and a rapid turnover in its membership providing enough are frequently present to create a significant volume of bidders. Multicasting among participant can distribute bids and information about what is information related to an offer [38].

- *Amusement-Products*: With the increase of interactive gaming products and such types of products among diminutive groups of community is another breed of application appropriate to adhoc networking. Certain function running on mobile devices considers the products, manages its communications and handle the turnover in participants [39].

- *Machine Enabled Transactions*: Various online transactions which use mobile devices that are already equipped with electronic-cash in order to make compensation at a point of sales (POS) and so on via IEEE 802.11 technologies [40].

- *Private Transactions*: In the dynamic environment of mobile adhoc network, it might happen that two or more peers can meet on the go and then agree to exchange their private information definitely with making aware of such transactions to any third party agents [41] in the wireless network

- *Collective Trading*: In mobile adhoc network, there is a huge feasibility that a group or communities of peer nodes who are in transmission range of each other and facilitated with mobile devices with each other and can spontaneously formulate a group for collective trading.

- *Electronic IOUs*: 'I Owe U' or its abbreviation 'IOU' is an established means to acknowledge a small debt usually among friends or family members [42]. This form of acknowledgement can be passed electronically via an ad hoc wireless network among trading parties who are in close proximity with each other. It can be signed to verify its authenticity and the identities of all handling parties.

V. PROBLEM DESCRIPTION

The serious issues to be highlighted are that conducting m-commerce secure operations over mobile adhoc wireless networks introduces added challenges and concern. Along with this, the adhoc wireless networks have particular problems which needed to be considered in research works in future. The major issued found are illustrated as below:

- *Transaction Management*: It is very difficult to execute secure effective transaction methods and moreover updates in mobile adhoc networks, which is due to its sole distinctiveness e.g. lack of infrastructure, having a dynamic network topology and using resource constrained devices. Majority of the traditional research work has utilized infrastructure based m-commerce which depends on a client/server model where information is fundamentally located placed on servers within the wired network and peer nodes act as clients accessing the services provided by the servers [43] along with an issue of service unavailability due to network disconnections [43]. Also, the in-depth idea of a transaction can be difficult to enforce as network intermittent disconnections will affect a particular service in a secure m-commerce operations succession to fail and accordingly the secure connectivity would be considered unfinished and will be subjected to abort [44].

- *Delivery of Service*: Due to the unique characteristics and complexities of an adhoc wireless network, existing service discovery and delivery protocols [45] do not seem to suit the needs of an adhoc wireless network, making them unsuitable for m-commerce oriented scenarios. Service advertisements and deliveries may need to be disseminated by a mix of a store and forward strategy as well as local multicasting to cope with intermittent online connectivity [45].

- *Trust-System*: One of the important factor of online communication in terms of security will be Trust, which assists in participating entities to ensure the secure transaction by extenuating improbability and risks involved in the transactions, such as ambiguity about trading groups or entities' pattern in fulfilling the transaction agreements [46]. On the other hand, as mobile adhoc network cannot rely on a network service provider to facilitate security services such as certification authority (CA) which can assists to design trust system among peer nodes in the existing network. It can also be observed that peer nodes have to rely on their peers in the network to provide trust verification in order to evaluate other nodes' fidelity. Yet, the nature of an adhoc wireless network makes trust scheme founding in this network intricate to accomplish.

The problems encountered in this field is multiplied more as to date, the majority of adhoc routing protocol research has been done using simulation only. One of the most motivating reasons to use simulation is the difficulty of creating a real implementation. In a simulator, the code is contained within a single logical component, which is clearly defined and accessible [47]. On the other hand, creating an implementation requires use of a system with many components, including many that have little or no documentation. The implementation developer must understand not only the routing protocol, but all the system components and their complex interactions. Results obtained through simulations cannot be ascertained for standardization of efficient of routing protocols in challenging environment of MANET in real time scenario, which will definitely pose an obstacle for real-time research and development. Further, since adhoc routing protocols are significantly different from traditional routing protocols, a new set of features must be introduced to support the routing protocol. In this journal, we describe the event triggers required for performing AODV operation, the design possibilities and the decisions for our Ad hoc On-demand Distance Vector (AODV) routing protocol implementation, AODV-DSDV. This journal is meant to aid researchers in developing their own on-demand mobile ad hoc routing protocols and assist users in determining the implementation design that best fits their real-time needs.

VI. PROPOSED SYSTEM

The main approach of the proposed design is to create a design for process oriented mobile commerce framework in real test bed. In order to do so, the prominent focus is laid to the design of the effective routing protocols as the experimental test bed is real time where the user are mobile and their mobility is very much variable, which makes the framework more challenging to ensure the effective security towards the architecture.

One of the great advantages of AODV is its integrated multicast routing [49]. Routing protocols are categorized into two types depending on how and when routes are discovered, but both discover the shortest path to the destination. Proactive routing protocols are table-driven protocols which always maintain current up-to-date routing information by transmitting control messages periodically between the hosts which update their routing tables. When there are alterations in the structure then the updates are propagated using the network. The proactive routing protocols deploy link-state routing algorithms which frequently flood the link information about its neighbors. Other routing protocols are on-demand routing protocols, in other words reactive one which create routes when they are needed by the source host and these routes are maintained while they are required. Such protocols use distance-vector routing algorithms; they have vectors containing information about the cost and the path to the destination. When nodes exchange vectors of information, each host modify own routing information when required. Till date, the majority of adhoc routing protocol research has been done using simulation only as seen in the previous section of related work. One of the most motivating reasons to use simulation is the difficulty of creating a real implementation. It is required that the implementation developer must comprehend not only the routing protocol, but all the system components and their complex interactions. Furthermore, since adhoc routing protocols are significantly different from traditional routing protocols, a new set of features must be introduced to support the routing protocol, which is the main focus of this research journal.

Some components where an adhoc wireless network like mobile ad hoc network (MANET) or Bluetooth is considered as a medium to carry out the transactions[49]. As the mobile commerce transactions will normally involve only mobile devices which are peers and have no assurance of infrastructure support from a network service provider, there are only two crucial entities involved in proposed adhoc m-commerce.

- Client: This entity is mainly mobile and utilizes adhoc wireless networks in order to get the digital contents [50], goods or services offered by the vendor or to business contents, products or services for others.

- Vendor: This entity provides the digital contents, products or services directly to clients via adhoc wireless networks for capital or who makes business out of the contents, products or services for others. In such condition, the vendor may also be stationary for example, a vending machine. Nonetheless, there are diversified feasible vital entity relationships in the adhoc m-commerce value chain.

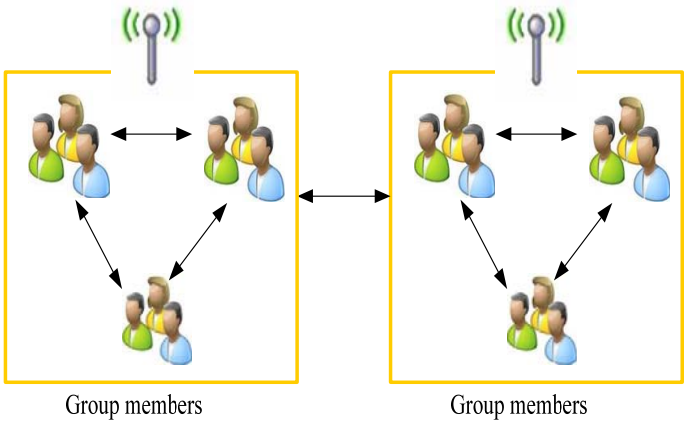

Fig.2: Trading between two consortiums

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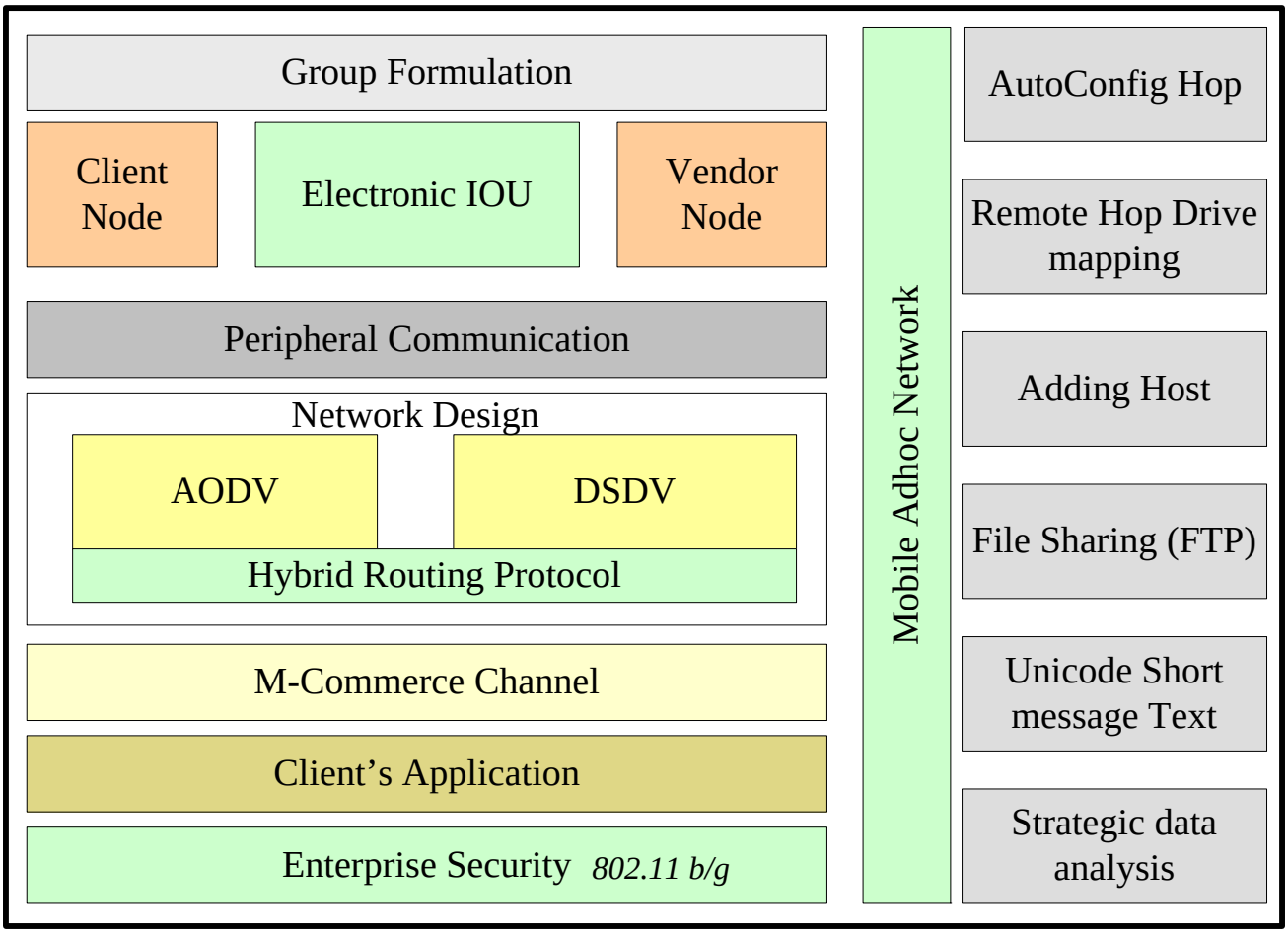

Fig 3. Process Oriented framework of the proposed m-commerce system

Fig 3. Represents the process oriented framework of the proposed mobile commerce system. The design is a consideration of the creating a secure mobile transaction in overlay network of our proposed hybrid protocol using AODV as well as DSDV.

The network will consists of peer nodes such as mobile devices or smart phones can also be utilized in order to purchase digital contents from a vendor, or initiate imbursement at specified Point of Sales (POS). E-cash credits can be preloaded and used via a Bluetooth or Wi-Fi technology to communicate with the vending machine, POS or parking toll [40]. But in most of the complex environment, where there can be multiple peer nodes may be involved in the secure m-commerce operations like auctions

Figure 2 represents a comparatively simple transaction involving two peer nodes. For example, two entities who are commuting in a medium be in agreement to trade their e-digital contents while they are within radio range of each other.

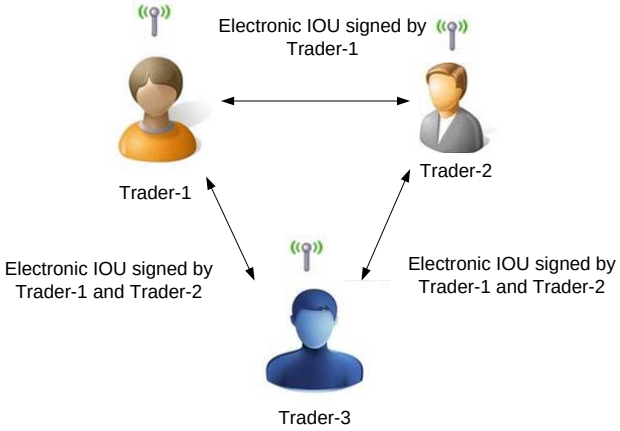

Fig.4. A delegated trading scenario.

The network highlights dual environments which involves the configuration of an adhoc trading consortium among mobile users who are in the surrounding area of each other and agree to group together for a explicit function, for example to make a collective purchase or to involve in a group trading. Figure 4 represents a hand over trading environment where an

electronic I Owe U (IOU) [42] is used to recognize debt between two parties trading via an ad hoc wireless network.

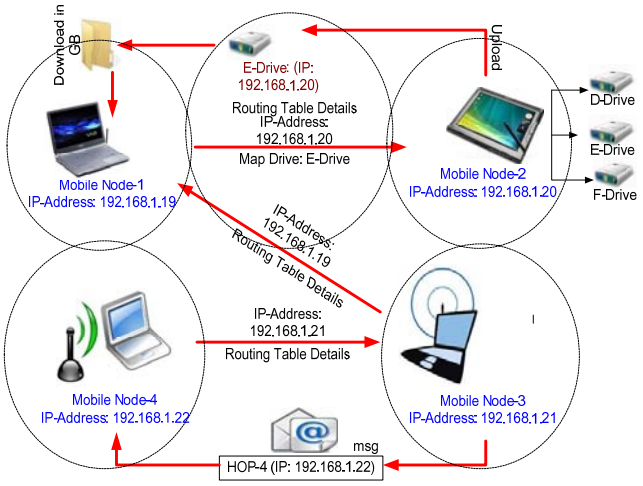

Fig.5. Overview of the real time set up plan

As an example, figure 4 below highlights a scenario in a local neighborhood where Trader 1, who has a digital product, wants to trade it for an another digital product. Trader 2, who is assumed to be within Trader 1's communication range and actually owns an digital product, agrees to trade with Trader 1 but does not want a have the digital product owned by Trader-1. So, Trader 1 issues an electronic IOU securely signed by himself to Trader 2 as an acknowledgement of his debt to Trader 2. Trader 2 can afterward exercise that electronic IOU to trade for another digital contents such that she wants with Trader 3, who wants a another digital content. Trader 3 will then use the electronic IOU signed by Trader 1 and Trader 2 to settle with Trader 1 for his product.

The goal of this research work is a real-time implementation of an adhoc routing protocol, using the 802.11 standard wireless protocols. Our implementation enables communication between several wireless stations or hops, on a dynamic network without using any infrastructure, i.e. using peer-to-peer mode, rather than depending on access points. Two distant units can communicate even when there is no direct connection between them.

The project is planned to implement two potential algorithms:

- Direct Sequence Distance Vector (DSDV) algorithm, which is a pro-active table driven algorithm. The routing in each station is executed according to local routing table. The tables are continually maintained and updated.

- Ad-hoc on demand Distance Vector (AODV) algorithm, which is a reactive algorithm, which operates only when there is demand from upper layer to send data.

The experiment is designed in Java platform, which has inherent support for wireless network operations. Thus, it is platform independent, and can run with various OS and IEEE 802.11 wireless cards. The scheme of real time set up is as highlighted in Fig 5.

VII. Experimental Setup

In order to perform this experiment, 5 Motorola Xoom Tablet PC, 5 IBM laptop and 10 Acer laptop with Intel Atom processor with 1.80 GHz, Ram Size of 2039 MB, and 32 bit OS. The wireless configuration will be 802.11a/b/g Wi-Fi inbuilt. The prototype design we are researching on is a windows application which runs on the wireless adhoc network. The project is planned to implement two potential algorithms: Direct Sequence Distance Vector (DSDV) algorithm, which is a pro-active table driven algorithm. The routing in each station is executed according to local routing table. The tables are continually maintained and updated. Ad-hoc on demand Distance Vector (AODV) algorithm, which is a reactive algorithm, which operates only when there is demand from upper layer to send data. We chose to write the project in Java, which has inherent support for network operations. Thus, it is platform independent, and can run with various OS and wireless cards. Other functionalities of the project work includes auto configuration of hops for Middleware, Remote Hop Drive Mapping and host adding, File sharing with FTP with statistical transfer ratio and time detection, Transfer of Unicode Short Message Text to the destination hop, Strategic data analysis of Hop sequence, metric sequence number, lifetime, type, Detecting configuration with respect to header information, size of data packets, buffer size when reading file. The nodes move from a random starting point to a destination with a speed ranging from 0-5 m/sec.

VIII. Performance Analysis

The proposed process oriented architecture of the mobile commerce system depends completely on the efficient design of our routing protocol. The protocol needs to be checked for sustaining the highly dynamic mobility of the experiment in terms of packet delivery ratio. In order to check the performance of the real-time experimental test-bed, the criteria of evaluation will be to check the packet delivery ratio of large files normally in terms of GB along with bandwidth estimation. The application is also designed to estimate the bandwidth for checking the QoS. Fig 6. Comparison of packet delivery ratio of routing schemes. The proposed hybrid scheme is compared with traditional AODV, DSDV, DSR routing protocols by considering packet delivery ratio as the parameter for comparison along with number of mobile nodes (10). Packet delivery ratio was estimated by estimating

number of packet received by packets sent. The final estimates of the packet delivery ratio was confirmed using commercial network protocol analyzer (WireShark).

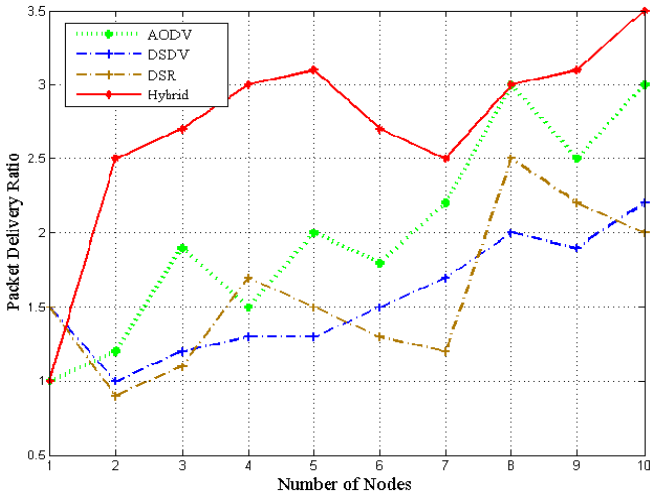

Fig 6. Comparison of packet delivery ratio of routing schemes

The proposed hybrid protocol as well as AODV has better results with increasing number of mobile nodes increasing packet delivery ratio. The packet delivery ratio of AODV is found to be increased as soon as quantity of mobile nodes as well as the pause time of the mobile nodes movement are incremented. DSDV has the better synchronous output till 8th node where the observation concludes as a very gradual rise, but performance has little degradation when the new mobile node (9th) joins the network, but however, it manages to communicate smoothly after 9th mobile node. The performance of the DSR protocol is found to be not so smooth with increment of mobile nodes. Majority of the experiment were performed in a closed room free from any EM radiation or any types of interference. In order to check the seamless connectivity, the 6th-10th mobile nodes were asked to conduct movement away from the closed room or in parking lawn but within sensing range of 5 meters. File of bigger size (GB) as well as peer activity application (transmission of Unicode short text character) has been attempted to transmit to check the efficiency of hybrid protocol, which was found to be work effectively.

IX. Security Requirements

In order to establish an appreciably tenable and trusted atmosphere for an operation to take place as well as to facilitate self-reliance to trading entities to participate in secure m-commerce operations, the following security services can be considered as an important functional requirement.

i. *Authentication*: Authentication is the first step which facilitates both trading entities participated in m-commerce transactions to substantiate the identity of each other before any transaction is conducted among the groups. This service ensures that any illegal third party or external agents is not masquerading as a legitimate party.

ii. *Privacy*: Privacy guarantees that secure transaction information sent across the network is incomprehensible by illegal third parties such as malicious eavesdroppers or peers acting only as communication relays, or DDoS attacks.

iii. *Reliability*: Reliability ensures that a message is being transferred is not illegitimately altered or destroyed during the transmission without this being detectable at the receiver side of an m-commerce system.

iv. *Non-repudiation*: This is another property of which assures that if an entity transmits a message, it will not be able to move away with denying after sending the message. Usually in m-commerce transactions, neither sender nor receiver should realistically be able to renounce offers or bargains struck between them. The sender should not be able convincingly to deny having sent the transaction message and the receiver should be able to verify that the transaction message can only have been sent by the specified sender and thus able to prove that a business has taken place between them. Along with this, as m-commerce transactions will include the threat of misbehavior among the trading entities, which they need support in measuring the intensity of reliability of other trading entities. Hence, attestation is another important security service for an adhoc m-commerce.

v. *Attestation*: Attestation enables an adhoc m-commerce peers to vouch for the identity, trading history or transaction reputation of other peer nodes. It assists alleviate threat in transacting with formerly unknown entities.

X. Conclusion

The proposed research journal discusses about the real time test-bed by designing process oriented architecture of a new hybrid protocol combining AODV and DSDV. The experimental results shows satisfactory results when the communication is attempted for larger size of file from one to another hop in mobile adhoc network. Developing a working implementation of an adhoc routing protocol is non-trivial and more difficult than developing a simulation. In real time implementation, various factors like battery lifetime, interference present in the room where the experiment is conducted, presence of EM radiations, mobility of nodes, performance of mobile device etc affects the results, when estimating the communication among the mobile nodes. The

simulation results conducted in the previous research work cannot be followed as a standard guidelines for commercial usage as the user might have dynamic scenario of implementation in real-time, which might not have been considered in simulation test bed. Once the programmer designs the application, then at the time of evaluation in practical scenario, various dynamic scenarios are often found missing at the time of coding process like fluctuation of battery, optimal performance of the laptops, which cannot be predicted about their performance, thereby posing a great challenge in implementing hybrid protocols in real time test bed. For these reasons it takes significantly more effort to create an ad hoc routing protocol implementation than a simulation. The wireless business as seen on mobile commerce networks seems most appropriate to fully online resource exchange and also to online launch trading in local groups where entities could easily meet to transfer digital contents and payment as agreed. But as seen in this research journal, in order to support such types of mobile commerce is more challenging as compared to wireless commerce within provider networks. This research journal highlights entities which will act as guidelines for serving the understanding for better quality efficient, secure, and reliable m-commerce system. There can be further work in terms of experimenting the communication in with respect to vehicular adhoc network, by estimating the average delay, packet drop, and packet delivery ratio, which will be our focus in future work. In summary, adhoc networks have the potential to become a serious part of tomorrows 4G communications networks. They can open up new business opportunities for network operators and service providers.

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