A WHITE PAPER ON THE MOBILE AD-HOC NETWORKS FOR THE EXISTING PROTOCOLS AND APPLICATIONS

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ABSTRACT

Mobile Ad Hoc Network (MANET) is a collection of two or more devices or nodes or terminals with wireless communications and networking capability that communicate with each other without the aid of any centralized administrator also the wireless nodes that can dynamically form a network to exchange information without using any existing fixed network infrastructure. And it's an autonomous system in which mobile hosts connected by wireless links are free to be dynamically and some time act as routers at the same time, and in this paper gives the distinct characteristics of traditional wired networks, including network configuration may change at any time , there is no direction or limit the movement and so on, and thus needed a new optional path Agreement (Routing Protocol) to identify nodes for these actions communicate with each other path, An ideal choice way the agreement should not only be able to find the right path, and the Ad Hoc Network must be able to adapt to changing network of this type at any time. and this paper gives all the information of Mobile Ad Hoc Network which include the History of ad hoc, wireless ad hoc, wireless mobile approaches and types of mobile ad Hoc networks, and then present the types of the routing Ad Hoc Networks protocols have been proposed. In this paper, the more representative of routing protocols, analysis of individual characteristics and advantages and disadvantages to collate and compare, and present the all applications or the Possible Service of Ad Hoc Networks.

KEYWORDS

Wireless Ad Hoc Networks, Mobility, Ad Hoc Network Routing Protocols, Wireless Mobile Approaches, MANET, mobile ad-hoc sensor network, QoS, Ah Hoc Applications.

1. INTRODUCTION

With the widespread rapid development of computers and the wireless communication, the mobile computing has already become the field of computer communications in high-profile link. Mobile Ad Hoc Network (MANET) is a completely wireless connectivity through the nodes constructed by the actions of the network, which usually has a dynamic shape and a limited bandwidth and other features, network members may be inside the laptop, Personal Digital Assistant (PDA), mobile phones, MP3 players, and digital cameras and so on. On the Internet, the original Mobility (mobility) is the term used to denote actions hosts roaming in a different domain; they can retain their own fixed IP address, without the need to constantly changing, which is Mobile IP technology. Mobile IP nodes in the main action is to deal with IP address management, by Home Agent and Foreign Agent to the Mobile Node to packet tunnelling, the Routing and fixed networks are no different from the original; however, Ad Hoc Network to be provided by Mobility is a fully wireless, can be any mobile network infrastructure, without a base station, all the nodes can be any link, each node at the same time take Router work with the Mobile IP completely different levels of Mobility.

Early use of the military on the Mobile Packet Radio Networked in fact can be considered the predecessor of MANET, with the IC technology advances, when the high-tech communication equipment, the size, weight continuously decreases, power consumption is getting low, Personal Communication System (Personal Communication System, PCS) concept evolved, from the past few years the rapid popularization of mobile phones can be seen to communicate with others anytime, anywhere, get the latest information, or exchange the required information is no longer a dream, And

we have gradually become an integral part of life. Military purposes, as is often considerable danger in field environment, some of the major basic communication facilities, such as base stations, may not be available, in this case, different units, or if you want to communicate between the forces, we must rely on This cannot MANET network infrastructure limitations. In emergency relief, the mountain search and rescue operations at sea, or even have any infrastructure cannot be expected to comply with the topographical constraints and the pressure of time under the pressure, Ad Hoc Network completely wireless and can be any mobile feature is especially suited to disaster relief operations. When personal communication devices and more powerful, some assembly occasions, if you need to exchange large amounts of data, whether the transmission of computer files or applications that display. If we can link into a temporary network structure, then the data transmission will be more efficient without the need for large-scale projection equipment would not have point to point link equipment (such as network line or transmission line). The current wireless LAN technology, Bluetooth is has attracted considerable attention as a development plan. Bluetooth's goal is to enable wireless devices to contact with each other, if the adding the design of Ad Hoc Network (MANET).

2. WIRELESS AD HOC NETWORKS

MANET is a collection of two or more devices or nodes or terminals with wireless communications and networking capability that communicate with each other without the aid of any centralized administrator also the wireless nodes that can dynamically form a network to exchange information without using any existing fixed network infrastructure. And it's an autonomous system in which mobile hosts connected by wireless links are free to be dynamically and some time act as routers at the same time. All nodes in a wireless ad hoc network act as a router and host as well as the network topology is in dynamically, because the connectivity between the nodes may vary with time due to some of the node departures and new node arrivals. The special features of Mobile Ad Hoc Network (MANET) bring this technology great opportunity together with severe challenges [8].All the nodes or devises responsible to organize themselves dynamically the communication between the each other and to provide the necessary network functionality in the absence of fixed infrastructure or we can call it ventral administration, It implies that maintenance, routing and management, etc. have to be done between all the nodes. This case Called Peer level Multi Hopping and that is the main building block for Ad Hoc Network. In the end, conclude that the Ad Hoc Nodes or devices are difficult and more complex than other wireless networks. Therefore, Ad Hoc Networks form sort of clusters to the effective implementation of such a complex process.

In the following figure 1 will shows some nodes forming ad hoc networks, and there are some

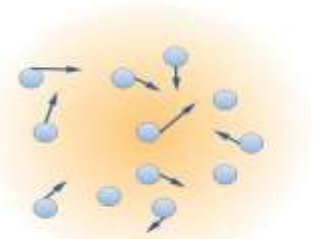nodes more randomly in different direction and different speeds.

Figure 1 Ad Hoc Network: Nodes mover randomly in different direction and different speed

In the past few years, the people became realized to use all the technology so widely and

the people's future living environments are emerging, based on information resource

provided by the connections of different communication networks for clients also we have seen a rapid expansion in the field of Mobile Computing because the proliferation not expensive, widely available wireless devices .A new small devices such as personal communication like cell phones, laptops, Personal Digital Assistants (PDAs),handhelds, and also there's a lot of traditional home appliances such as a digital cameras, cooking ovens, washing machines, refrigerators and thermostats, with computing and communicating powers attached. Expand this area to became a fully pervasive and so widely. With all of this, the technologies must be formed

3. WIRELESS MOBILE APPROACHES

The past decade the Mobile Network is the only one much important computational techniques to support computing and widespread, also advances in both software techniques and the hardware techniques have resulted in mobile hosts and wireless networking common and miscellaneous. Now we will discuss about to distinct approaches very important to enabling Mobile wireless Network or IEEE 802.11 to make a communication between each other [10, 11].

3.1. INFRASTRUCTURE WIRELESS NETWORKS

In this architecture that allow the wireless station to make a communication

the good and new standard of pervasive computing, that including the new standards, new tools, services, devices, protocols and a new architectures. As well as the people in this time, or the users of internet users in Ad Hoc network through increase in the use of its advantage is that not involve any connection link and the wiring needed to save space, and building low cost, and improve the use, and can be used in mobile phone, because of these advantage local wireless network architecture readily. And also beads in these advantages the wireless network can be used in the local area network terminal part of the wireless [9].

between each other, and this type relies on the third fixed party and we call it a Base Station, as shows in this figure 2, and that will handover the offered traffic from the Station to another, the same entity will regulate or organize the allocation of radio resources. When a source node likes to communicate with a destination node, the former notifies the base station. At this point, the communicating nodes do not need to know anything about the route from one to another.

All that matters is that the both the source and the destination nodes are within the transmission range for the Base Station and then if there's any one loses this condition, the communication will frustration or abort.
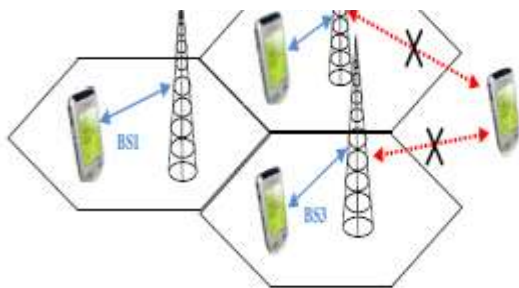

Figure 2   Shows the Infrastructure Network

The mobile wireless network As is well known a Ad Hoc Network MANETs, As has been previously defined in the Bidder is a collection of

3.2 INFRASTRUCTURE LESS WIRELESS NETWORKS:

two or more devices or nodes or terminals with wireless communications and networking capability that communicate with each other

without the aid of any centralized administrator also the wireless nodes that can dynamically form a network to exchange information without using any existing fixed network infrastructure.

ture less it's important approaches in this technique to communication technology that supports truly pervasive computing widely duo to there's a lot of context information need to exchange between mobile units can not rely on the fixed network infrastructure, but in this time the communication wireless became develops very fast. In figure 3 we will see a small example for the Ad Hoc networks, to explain the work for the Ad Hoc network.
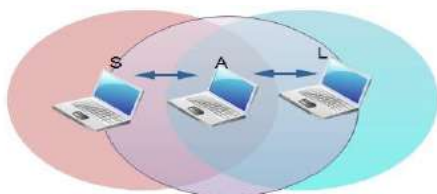
4. TYPES OF AD HOC NETWORK

The wireless Ad Hoc Network divided into two main types, firstly quasi-static Ad Hoc Network secondly, Mobile Ad Hoc Network (MANET). In the quasi-static Ad Hoc network the nodes may be portable or static, because the power controls and link failures, the resulting network topology may be so active. The Sensor

Mobile Ad hoc Networking (MANET) is a group of independent network mobile devices that are connected over various wireless links. It is relatively working on a constrained bandwidth. The network topologies are dynamic and may vary from time to time. Each device must act as a router for transferring any traffic among each other. This network can operate by itself or incorporate into large area network (LAN). There are three types of MANET. It includes Vehicular Ad hoc Networks (VANETs), Intelligent Vehicular Ad hoc Networks (InVANETs) and Internet Based Mobile Ad hock Networks (iMANET). The set of application for MANETs can be ranged from small, static networks that are limited by power sources, to large-scale, mobile, highly dynamic networks. On top of that, the design of network protocols for these types of networks is face with multifaceted issue. Apart from of the application, MANETs need well-organized distributed algorithms to determine network

And it's an autonomous system in which mobile hosts connected by wireless links are free to be dynamically and some time act as routers at the same time [12, 13], the infrastruc

This figure illustrates the modus operandi of Ad Hoc networks, there's a three nodes Ad Hoc Network (S, A, L), the source node (S) need to make a communication with the destination node (L) and both of them (S, L) not in the same transmission range of each others, here both they must use the node (A)to send/ receive or forewords the Packets from source to the destination that means from node to another node.(R) is a node work as host and router in the same time . Also as we know the definition for the router is an entity that determines the path to be used in order to forward a packet towards its last destination. And then the router chooses the next node to which a packet should be forwarded according to its current understanding of the state of the network.

Network is an example for the quasi-static Ad Hoc Network [14]. In the Mobile Ad Hoc network (MANET) here the entire network may be mobile and the nodes may move fast relative to each other. And now we will discuss both of them.

4.1 MOBILE AD HOC NETWORKING (MANET)

organization, link scheduling, and routing. Conventional routing will not work in this distributed environment because this network topology can change at any point of time. Therefore, we need some sophisticated routing algorithms that take into consideration this important issue (mobile network topology) into account. While the shortest path (based on a given cost function) from a source to a destination in a static network is usually the optimal route, this idea is not easily far-reaching to MANETs. Some of the factors that have become the core issues in routing include variable wireless link quality, propagation path loss, fading, interference; power consumed, and network topological changes. This kind of condition is being provoked in a military environment because, beside these issues in routing, we also need to guarantee assets security, latency, reliability, protection against intentional jamming, and recovery from failure. Failing to abide to of any of these requirements

may downgrade the performance and the dependability of the network.

4.2 MOBILE AD HOC SENSOR NETWORK

A mobile ad-hoc sensor network follows a broader sequence of operational, and needs a less complex setup procedure compared to typical sensor networks, which communicate directly with the centralized controller. A mobile ad-hoc sensor or Hybrid Ad Hoc Network includes a number of sensor spreads in a large geographical area. Each sensor is proficient in handling mobile communication and has some level of intelligence to process signals and to transmit data. In order to support routed communications between two mobile nodes, the routing protocol determines the node connectivity and routes packets accordingly. This condition has makes a mobile ad-hoc sensor network highly flexible so that it can be deployed in almost all environments [15]. The Wireless ad-hoc sensor networks [16] are now getting in style to researchers. This is due to the new features of these networks were either unknown or at least not systematized in the past. There are many benefits of this network, it includes:

• Use to build a large-scale networks

• Implementing sophisticated protocols

• Reduce the amount of communication (wireless) required to perform tasks by distributed and/or local precipitations.

• Implementation of complex power saving modes of operation depending on the environment and the state of the network.

With the above-mentioned advances in sensor network technology, functional applications of wireless sensor networks increasingly continue to surface. Examples include the replacement of existing detecting scheme for forest fires around the world. Using sensor networks, the detecting time can be reduced significantly. Secondly is the application in the large buildings that at present use various environmental sensors and complex control system to execute the wired sensor networks. In a mobile ad-hoc sensor networks, each host may be equipped with a variety of sensors that can be organized to detect different local events.

Besides, an ad-hoc sensor network requires a low setup and administration costs [16, 17, 18].

5. TYPES OF AD HOC PROTOCOLS

Ad Hoc Network routing protocols is divided to three type of routing protocols, which that depending on a different of routing protocols [20-26].

5.1 ORIENTED ROUTING TABLE (TABLE-DRIVEN)

It is an active routing environment in which the intervals between the wireless nodes will send medical information with more paths. Each wireless node is on the basis of information gathered recently to change its route table. When the network topology change makes the original path is invalid, or the establishment of any new path, all nodes will receive updates on the status path. The path will be continuously updated, so that the node in time of peace on its own routing tables is ready, and immediately available when needed. However, such agreements must be periodically to broadcast messages, so a considerable waste of wireless bandwidth and wireless node power, but if you want to reduce the broadcast bandwidth consumption caused by a large number, we should lengthen the interval between each broadcast time, which in turn will result in the path table does not accurately reflect network topology changes.

5.2 DEMAND-DRIVEN (ON-DEMAND)

When needed to send packets only it began to prepare to send the routing table. When a wireless node needs to send data to another wireless node, the source client node will call a path discovery process, and stored in the registers of this path. The path is not valid until the expiration or the occurrence of conditions of the agreement with the first phase of a ratio of such agreements in each node. A smaller amount of data needed, and do not need to save the entire network environment and the routing information. The main benefit of this agreement is that the use of a lower bandwidth, but the drawback is that not every wireless node that sends packets can always quickly find the path. The path discovery procedure can cause delays and the average delay time is longer [27].

5.3 HYBRID

It is an improvement of the abovementioned two, or the combination of other equipment, such as global positioning system (GPS) and other equipment, participate in the study of mechanisms to facilitate the routing of the quick search, and data transmission.[28,29] However, there are already more than 13 kinds of the above routing protocol have been proposed, following the more representative for several separate presentations, and to compare their individual differences lie. And then we will discuss about everyone and we will show the way to works everyone works.

6. EXISTING AD HOC PROTOCOLS

For the Ad Hoc network there are more than 13 kinds of the above routing protocol have been proposed, following the more representative for several separate presentation, and to compare between them, and for more dilates about existing ad hoc network protocols [2].

6.1 DESTINATION-SEQUENCED DISTANCE-VECTOR ROUTING (DSDV)

Destination-Sequenced Distance-Vector Routing [30, 1] is based on traditional Bellman-Ford routing algorithms were developed by the improvement, and a routing table-based protocol. Each node in an operation must be stored a routing table, which records all the possible links with the nodes in the node and the distance like the number of hops, routing table within each record also contains a sequence number, which is used to determine are there any more old path in order to avoid routing table generation. DSDV is basically on the Internet Distance-Vector Routing the same, but more destination sequence number of the record, makes the Distance- Vector Routing more in line with this dynamic network MANET needs, In addition, when network topology changes are less frequent when the routing table does not need to exchange all the information, DSDV, within each node, together with a table, is used to record the routing table changes from the last part of the exchange so far, if you change a lot of the conduct of all the information The exchange, known as the full dump packets, if the change very little, it is only for the part of the exchange, known as the incremental packet.

6.2 GLOBAL STATE ROUTING (GSR)

Global State Routing (GSR) [8] is almost the same as DSDV, because it has the idea of link state routing but it makes a progress by decreasing the flooding of routing messages. In this algorithm, each node maintains a neighbor list, a topology table, a next hop table and a distance table.

- The neighbour list of a node includes the list of its neighbours (all nodes that can be heard by it).
- The link state information for each destination is maintained in the topology table together with the timestamp of the information.
- The next hop table includes the next hop to which the packets for each destination must be dispatched.
- The distance table contains the shortest distance to each destination node. The routing messages will be created on a link change as in all link state protocols. Whenever it accepts a routing message, the node updates its topology table if the sequence number of the message is later than the sequence number stored in the table and it then reconstructs its routing table and broadcasts the information to its neighbours.

6.3 CLUSTER HEAD GATEWAY SWITCH ROUTING (CGSR)

Cluster head Gateway Switch Routing [1] is to build from the DSDV above a routing protocol, using a cluster head to manage a group of action nodes, that is, the action is divided into a group of a group of nodes, each elected by a head, the cluster head among through a gateway to connect to each other, into a hierarchical structure. Whether a link between nodes within a cluster, or a link between each cluster head, are based on DSDV routing, so each node also needs a routing table for the record, in addition to DSDV need some information is also necessary to routing table with a record of all the other nodes and the corresponding cluster head.
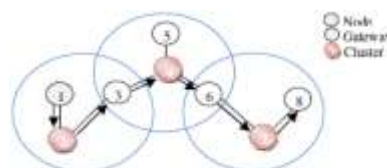
Figure 4 CGSR: routing from node 1 to node 8

In the end web of which nodes should be selected as cluster head, and when the cluster head movement and also how to avoid future path changes significantly under to find a new head, all in real CGSR to allow for the more difficult areas.

6.4 WIRELESS ROUTING PROTOCOL (WRP)

Wireless Routing Protocol [3] makes use of the routing table at each node in the record to complete the routing, and DSDV with CGSR difference is that, WRP require each node to operate a record four tables, namely Distance table, Routing table, Link-cost table, Message retransmission list table. WRP use the update message between adjacent nodes in each pass is used to determine whether the adjacent nodes to maintain their link relationship, and Message retransmission list (MRL) is used to update records which need to re-transmission, and which update needs acknowledgement. WRP use of distance and the second-to-last hop information to find the path, such an approach can effectively improve the distance-vector routing possible count-to-infinity problem.

6.5 FISHEYE STATE ROUTING (FSR)

Fisheye State Routing (FSR) [9] is an enhancement of GSR. The large size of update messages in GSR dissipates a substantial amount of network bandwidth. In order to overcome this problem, FSR will use a method where each updated messages would not includes information about all nodes. As an alternative, it swaps information about neighbouring nodes regularly than it does about farther nodes, thus reducing the update message size. In this way, each node gets accurate information about near neighbours and accuracy of information decreases as the distance from the node increases. Even though a node does not have accurate information about distant nodes, the packets are routed correctly because the route information becomes more and more accurate as the packet moves closer to the destination.

6.6 AD HOC ON-DEMAND DISTANCE VECTOR ROUTING (AODV)

Ad Hoc On-Demand Distance Vector Routing using distance-vector concept [30], but in several different ways and the above is that,

node 8

AODV does not maintain a routing table, but when a node needs to communicate with another node on demand only to the approach to building routing table. When a node wants to send data to another node in the network, the first to broadcast a Route Request (RREQ) packet [36], RREQ where the record that this is given by which a source is to be used to find which of a destination node. RREQ in the network is a kind of flooding of the transfer mode, destination until they were received, of course, a node can only be processed once on the same RREQ in order to avoid routing loop generation. In theory all the nodes between the source and the destination of the RREQ will be passing a temporary record will be on the last hop of the RREQ via Path of information, when the destination of the RREQ received from different places, choose a shortest path, and to the source sent the direction of
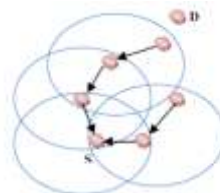
Route Reply (RREP).

Figure 5 AODV: reverse path formation

As the RREP of passing along the nodes on this path will be a record of the relevant information, when the RREP was sent to a sent RREQ the source the beginning, this section of the path from source to destination even been established, and thereafter source can use this route to send packets to the destination.

Figure 6 AODV: forward path formation

6.7 CLUSTER BASED ROUTING PROTOCOL (CBRP)

In Cluster Based Routing protocol (CBRP) [6], all the nodes are separated into clusters. In order to arrange the cluster, the

following algorithm is used. When a node comes up, it will go into the "undecided" state and broadcasts a Hello message. When a cluster-head gets this hello message it will reacts with a triggered hello message immediately. When the undecided node gets this message it changes its state to "member". If the undecided node times out, then it will turn as a cluster-head. If it has a bi-directional link to some neighbour, otherwise it remains in undecided state and repeats the procedure all over again. Cluster-heads are changed as occasionally as possible. Each node maintains a neighbour table. For each neighbour, the neighbor table of a node contains the status of the link and the state of the neighbour (clusterhead or member). A cluster head maintains information about the members of its cluster and also maintains a cluster adjacency table that contains information about the neighboring clusters. For each neighbor cluster, the table has entry that contains the gateway through which the cluster can be reached and the information about the cluster head. When a source has to send data to destination, it floods route request packets (but only to the neighboring cluster-heads). While receiving the request, a cluster head will checks whether the destination is in its cluster. If yes, then it sends the request directly to the destination or it will send to all its adjacent cluster-heads. The clusterheads address is documented in the packet. Then a cluster-head will discards a request packet that has been detected. When the destination receives the request packet, it will reply with the route that had been recorded in the request packet. If the source does not receive a reply within a stipulated time period, it will backs off

And the below table shows the comparison between Table Driven, Demand Driven and Hybrid in Table 1, and then we show in table 2 the Table Driven for three kind of protocols such as WRP, CGSR, DSDV and

7.QUALITY OF SERVICE

With the rapid development of Internet technology, when people for the Best effort service is no longer satisfied, how to get more bandwidth, how to reduce the mistakes, how to reduce the delay phenomenon, making Quality of Service (QoS) related research, including the Integrated Service (RSVP), Differentiated Service, etc., has become an important research

exponentially before trying to send out another route request.

In CBRP, routing is done by using the source routing. It also uses the route shortening when receiving a source route packet. The node will attempt to find the farthest node in the route and sends the packet to that node and therefore reducing the route. In the process of transferring the packet, if a node detected a broken link, it will send back an error message to the source and then uses a local repair mechanism. In local repair mechanism, if a node detected that the next hop is inaccessible, it will investigate to see if the next hop can be reached through any of its neighbor. If any one of it works, the packet can be sent out over the repaired path.

6.8 SIGNAL STABILITY ROUTING (SSR)

Signal Stability Routing and ABR also added a link to the consideration of stability, is divided into Dynamic Routing Protocol with Static Routing Protocol in two parts. DRP and ABR, as the use of adjacent nodes in each other to define the beacon transmission links are stable, but the DRP only record is strong or weak, that is, a qualitative classification of links, rather than the ABR quantified associatively tick down the value. SRP to use the information obtained by DRP, in the path to the establishment of the process, requires that each downstream node only in the Route request time from the strong link in order to continue broadcasting route request, select the first to reach the final destination of the request, along the source-side reply to establish a path, so SSR can establish a strong link in the shortest possible, and on the best path.

comparison between them, Demand Driven (On-Demand) with six type of protocols such as TORA, DSR, AODV, ABR, CEDAR and SSR and comparison between them shows in table 3.

topic. In the above-mentioned several agreements, most of them are made in the last two years, only for the basic mode of operation be defined, there is no consideration of QoS, only the ABR (Associativity Based Routing), SSR (Signal Stability Routing) and CEDAR (Core – Extracted Distributed Ad hoc Routing) and so there are three kinds of QoS-related functions.

By ABR, for example, ABR defined by the concept of associativity is that QoS can be used to indicate a link between adjacent nodes stability, while the adjacent node in the exchange of messages, you can also Bandwidth, Delay and other conditions to join, this way then when you select a path, you can have more choices, but also can do according to the different applications of different considerations to select the most appropriate path may be to ensure a minimum bandwidth that can be used, or between two points of a finite delay. However, in the MANET, the network patterns change at any time, each node may change at any time position, that is, each node is the relationship with the adjacent node may change at any time, therefore, means that the need to provide QoS dependent on regular Beaconing, so that each node to master the situation around in order to provide effective QoS information. Beaconing make the overhead on the network increased, when the node mobility to improve even when the general information that may affect the transmission, which will be in the Ad Hoc Network to provide QoS, the biggest problem.

8. APPLICATION IN AD HOC NETWORKS

There are a lot of potential applications applied on the Ad hoc networks and to support the Ad hoc Network Model to create a simple Ad Hoc Network, and that application such as the European telecommunications standard institute (ETSI) also the HIPERLAN/2 standard IEEE 802.11 wireless LAN standard family

Bluetooth the Ad Hoc Network are very important area in this time and very useful for the military (battlefield) and for the disasters (flood, fire and earthquake and so on),meetings or conventions in which people wish to quickly share information and then use it in the emergency search-and-rescue operations, recovery, home networking ,as we will discuss that in the next table.

Nowadays, Ad Hoc Network became so important in our circle life, because can be applied anywhere where there is little or without communication infrastructure or may be the existing infrastructure is expensive to use. Also the Ad Hoc Networking allows to nodes or devices to keep the connections to the network for as long as it's easy to add and to remove to the end of the network. And there are a lot of varieties of applications for the Mobile Ad hoc Networks, ranging large scale such as Dynamic Network and Mobile and small fixed-constrained energy sources. As well as legacy applications that move from the traditional environment to the Ad Hoc infrastructure environments, a great deal of new services can and will be generated for the new environment, finally as the result the mobile Ad Hoc Network is the important technique for the future and to became for the fourth generation (4G), and the main goals for that to provide propagation the computer environments, that support the users to achieved the tasks to get the information and communicate at anytime, anyplace and from any nodes or devices. And now we will present some of these practical applications as been arranged in table 1, and then we will discuss some of these application.

Table 1 shows some of the Applications of Ad-hoc Network

Applications	The Possible Service of Ad Hoc Networks
Tactical networks	• Military communication. • Military operations. • in the battlefields.
Emergency services	• Search and rescue operations in the desert and in the mountain and so on. • Replacement of fixed infrastructure in case of environmental disasters • Policing • fire fighting • Supporting doctors and nurses in hospitals
Coverage extension	• Extending cellular network access • Linking up with the Internet, intranets, and so on.
Sensor networks	• Inside the home: smart sensors and actuators embedded in consumer electronics. • Body area networks (BAN) • Data tracking of environmental conditions, animal movements, chemical/biological detection
Education	• Universities and campus settings • Classrooms • Ad hoc Network when they make a meetings or lectures
Home and enterprise networks	• Using the wireless networking in Home or office. • Conferences, meeting rooms • Personal area networks • Personal networks.
Context aware services	• Follow-on services: call-forwarding, mobile workspace • Information services: location specific services, • time dependent services • Infotainment: touristic information
Commercial and civilian environments	• E-commerce: electronic payments anytime and anywhere • Business: dynamic database access, mobile offices • Vehicular services: road or accident guidance, transmission of

	road and weather conditions, taxi cab network, inter-vehicle networks
	• Sports stadiums, trade fairs, shopping malls and so on.
	• Networks of visitors inside the airports.

14. CONCLUSIONS

In this paper we presented an exhaustive survey about the Mobile Ad Hoc Network (MANET) we distinct the characteristics of traditional wired networks, wireless ad hoc networks, wireless mobile approaches and types of ad hoc network as well as all the existing ad hoc protocols, and we comparison between the different papers, most of its conclusions pointed to a phenomenon, not a routing protocol can adapt to all environments, whether it is Table-Driven, On-Demand or a mixture of two kinds, are limited by the network characteristics; even though the same part of the Agreement On-Demand also due to the differences in the mode of operation applicable to different types of network. Also we discussed in this paper the relevant Ad Hoc Network on a multicast (Multicasting), Applications on Ad Hoc Networks, QoS and other topics will be able to see the latest research results, can be expected is that the Ad Hoc Network needs and applications will start to appear in recent years, Ad Hoc Network-related research have become the current Internet trends One of the most anticipated technology.

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