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A Survey of Trust based Adaptive Gateway Discovery in MANET for Integrated Internet

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ABSTRACT

Mobile ad hoc network (MANET) is a group of mobile nodes forming a temporary network of the without aid any centralized administration or established infrastructure. The wireless & dynamic nature more vulnerable to leaves them of Mobile adhoc networks their wired counterparts' security attacks. A routing message originate is judge to a main challenge either or not trustworthy node. A vital role of Public key management (PKM) in mobile ad hoc networks plays where networking in security in many cases depend on the Public key Management (PKM). A composite key management (CKM) scheme is applied without using a centralized trusted certificate authority (CA). However, the resource constrained of mobile ad hoc networks environment in design a fully distribute have an imposed great of challenges unique characteristics of MANET public key management protocol. The existing approach define concept of trust based on soft security mechanism (SSM) instead using hard security mechanism (HSM) as in traditional security techniques to remove security vulnerabilities. A trust threshold determines either or not trusts another node composite trust based public key management (PKM) employs has been proposed without using a centralized trust certificate authority (CA). There are three components of trust: - Integrity (I), Social Contact (SC) and Competence(C) where of trust values evaluate based on direct & indirect evidences. But this assurance does not give a node by sending & receiving the keys. So, we propose a system as a trust evaluation using based on the Non-repudiation on public key management (PKM) in hybrid of mobile ad hoc network. We consider new trust component (Non - repudiation) to provide of private or public keys that a node does not assurance falsely deny sending & receiving within the Hybrid mobile ad hoc networks (MANETs). This approach also security vulnerabilities the mitigates, minimizes the risk & communication overhead with in the performance an increase of the network.

***Keywords*: Certificate Authority (CA), Key Management Network Security, Mobile adhoc networks (MANETs), Trust Management, and Non-repudiation.**

I.INTRODUCTION

MANET is a basically special type of ad hoc network. Mobile Ad hoc networks, communication device of limited range internet connection through gateway of sharing data among devices which wired internet an interconnection with wireless MANET. It is mobile node for the significant of internet access give detect the available gateways. Gateway discovery is use to proactive, reactive & hybrid to viable register in mobile nodes with internet gateways. The various mobile nodes are a set of collection in the MANET. They cannot depend on terminals and have organized connectivity or centralized. The communication limited range of large mobile ad

hoc networks varies small, static topologies, highly and mobile dynamic networks. A major number of challenges to the technological devices are related to be solved protocols, services and applications. These are drawback of mobile ad hoc network, limited bandwidth, frequent disconnection, limited wireless coverage, limited features, dynamic network topology and low battery power. Wireless node not allows the fixed infrastructure [1]. The data transfer among mobile nodes (MNs) which establish within mobile ad hoc networks is a single hop and many hops are required to the limited range of transmission to the single mobile nodes (MNs). The (heterogeneous) different type of network is an Integrated Internet-mobile (IIM) mobile ad hoc network (MANET) which communication among (infrastructure-based and wireless ad hoc) networks is necessary to remote inaccessible area then web services making in an ad hoc networks available anywhere, and anytime. So each node do work as router in a mobile ad hoc network which move can in all direction with movements of the other nodes in speed independently. MANET is the behavior to the wireless network continuous change which can be taken executed into the relation by protocols, with widespread application is increase number of portable devices and progress wireless communication of the gaining importance ad hoc networking. In a general way, in this case network of infrastructure is the building of in convenient to use or expensive or desired is a temporary communication every situation for the suitable are used to the terminal (Cellular Phones, Personal Digital Assistants, Laptop, etc.) can co-exist in the MANET. These are every device allows which related to the ad hoc networking of the maintain connections network so removing devices and easily adding by the network. MANETs [2, 3] are some of the popular applications. Sensor networks and Bluetooth and personal area networking, crisis management applications, military missions, and collaborative work, etc. These are drawback of (MANETs) [4], limited bandwidth, frequent disconnection, limited wireless coverage, limited features, and dynamic network topology and low battery power. MANET is a wireless links with communication composed to the mobile devices which unrestricted mobility between two are more nodes connected through the routes, then eternally self-configure maintain to the mobile nodes. When between two networks is connect (Internet and MANET) to achieved via through the special router is acts to the Internet Gateway.

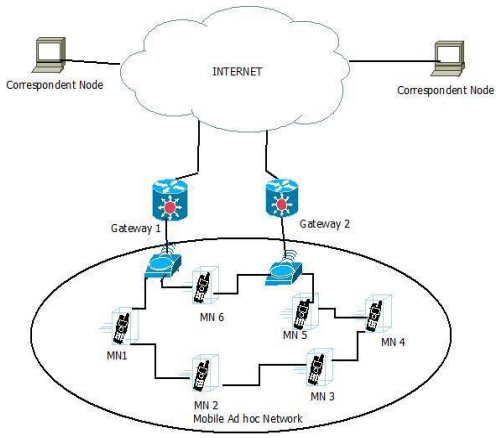

Fig1:- Mobile Ad hoc Network

This figure is two gateways with contact in motion go to the mobile nodes. So, cannot be find actual position on the mobile nodes. As this element is presents a (MNs) mobile node connecting and execute of the internet, it

needs to the following tasks. Internet Gateway of selection and identification: - the specific messages emit to the available Gateways to identify gateways can be generate on demand or periodically messages to the other hand, Internet Gateway is selection to the number of hops is based on routes to gateway contain and another can be taken as a route in the delay or traffic load. IP (Internet Protocols) address accessible of construction: - This present two type of IP address first one is a stateful and second one is stateless. The stateful IP address distributes which an entity by support in the network and stateless responsible for the personal IP address are nodes. A (DAD) duplicated Address Detection is a unique network chosen in the IP address guarantee to the permits.

1.1 Applications of MANET

- (TN) Tactical Networks.
- (AB,MC)Automated Battlefields, Military Communication.
- (ES) Emergency Services.
- (RO&S) Rescue Operations and Search.
- Disaster Recovery: - Hurricanes, Earthquakes.
- Home & Entertainment.
- Home Wireless Networking, Office Wireless Networking.
- (PAN) Personal Area Network.
- (MG) Multiuser Games.
- (OIA) Outdoor Internet Access.

1.2 Challenges in MANET

1. Limited Bandwidth: -They have many wireless links so it is continue to the particular lower capacity of the infrastructure networks. in accounting of the several times access for the effects, sound, fading, interference conditions to be throughput are realized of the wireless communication oft much a radio's less than maximal transmission rate.

2. Dynamic Topology:-It may be disturbed membership of the trust relationship due to the dynamic topology of among nodes. This trust also disturbed to be the detected compromised considerable nodes.

3. Routing Overhead: - In mobile adhoc network (MANET), their location over of the network may be habitually changed of nodes. So, it is leads unnecessary due to routing overhead of some stale routing table in the generation.

4. Hidden Terminal Problem: - The name of propose, the crash parcels at a get hubs is the terminal issue alluded as because of the synchronized transmission these are hubs by the ought not to be immediate correspondence scope of collector in show disdain toward within transmission scope of sender.

5. Packet Losses due to Transmission Errors:-The mobile adhoc wireless network is a high packet loss practiced by means factors increase collision with in presence of the hidden terminal also presence of the interference, repeated path breaks & uni-directional links due to the mobility of nodes.

6. Mobility-induced route changes:-An adhoc wireless network dur to the dynamic topology, it highly dynamic movement in nature due to nodes. Hence the session also regular from suffers on-going path break. This situation of the mostly leads underlying frequent of the route changes.

7. Battery Constraints:-These networks are used in containing battery devices. So, they have maintaining portability for restrictions on power source weight of device and its size.

8. Security Threats:-The network design provides many new of the security challenges by wireless mobile ad hoc nature of mobile ad hoc network and mobile adhoc network functionality wireless medium vulnerable is heavily of the eavesdropping. The MANET functionality through cooperation is done node between MANET. These are security attacks numerous exposed intrinsically.

II.SECURE ROUTING PROTOCOLS

Authentication Routing Adhoc Network (ARAN) proposes of the detect and prevent an algorithm most of the cryptographic certificates through providing security attacks. The protocol provider of authentication non-repudiation and message integrity a part MANET for minimal security policy it is provides of the basic certification process follow end to end authentication that guarantees by route detection process. Thus, in communication can participate are authentication at only authorized nodes and end to end message. Mobile Ad hoc networks (MANET) for authentication protocol an efficient node and Robust an efficient proposes mobile adhoc networks for key exchange protocol. [5,6] An integrated can be routing protocol with integrated of framework to provide security and routing. To objective its achieve, the Reactive Routing Protocol in the network route request message so broadcast for MANET to the discovered route to destination. The key exchange proposed protocol this approach to the public keys retrieves of the nodes utilizes. To a certificate find of the public key, the source node of a network floods with certificate request by target node is replied or valid certificate by an intermediate node has a target node of public key. An algorithm MANET in Robust Secure Routing Protocol a proposes to secure routing protocol and build a robust in MANET. This encryption and decryption based on algorithm of the messages such as some basic of schemes on RSA_CRT: CRT generation for safety key, secure routes generation for principle of Shamir's secret sharing. Any malicious node which are free from those routes and set of the disjoint routes amid a source-destination pair which belong to as considered are probable routes. Those probable routes on applied to gain of secure routes are Shamir's secret sharing principle. Finally, Stable route and most trustworthy is select between those secure routes. Selections depend upon final route particular criteria in a route of present nodes. e.g. Mobility, trust value and battery power.

III. NETWORK SECURITY

3.1 Security Attacks

The basis behavior of attacks can be categorized as (Active and Passive) Attack.

1) Active attacks: Active attacks on the network are very deuce attacks that prevent message flow of the between nodes. There are two types of active attacks internal attacks or external attacks. [7, 8] that does not belong to network can be carried out active external attacks by outside sources. Malicious nodes from are Internal attacks which are part of the network, more hard and severe to detect than internal attacks, external attacks. These are attacks generate of unauthorized to access the network, that helps make changes to attacker such as a DoS, Congestion, Modification of the Packets, etc.

- Dropping Attacks.
- Modification Attacks.
- Fabrication Attacks.

2) Passive attacks: A data transmitted in the network does not alter the passive attack. But this includes unauthorized "listening" of the accumulates data or network traffic from it, the passive attacker is does not disrupt of the operation a routing protocol to discover the important information to attempts from traffic routes.

3.2 Security Goals

1. Availability: -At suitable assets times are accessible or available by authorized user's availability. Both service and data come below availability. All the network service always should be available through even DOS) an attack occurs.

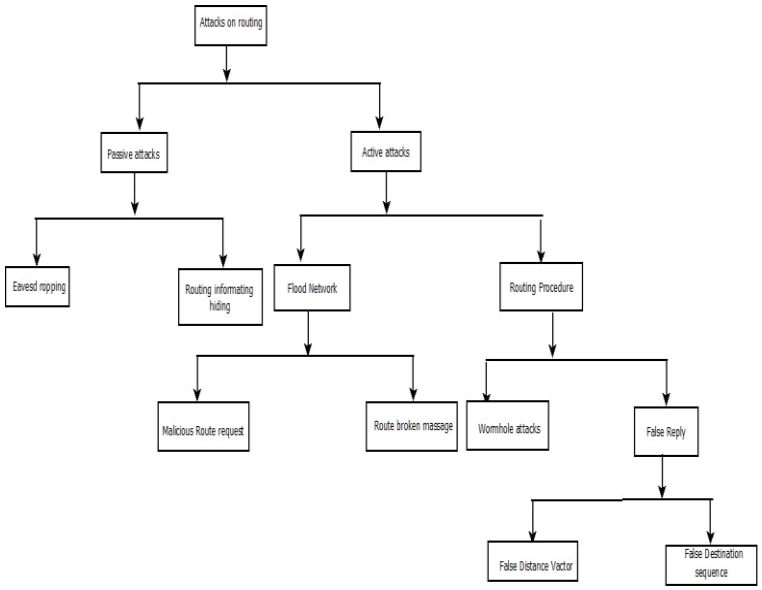

Fig2: - Types of Attacks

2. Confidentiality: - There are guarantees about whole asset of computer are available particularly for authorized parties and accessed particularly by them. All things are confidentiality. The protected from should be Information exchanged between participants unauthorized users in mobile adhoc networks (MANETs). Unauthorized access and eavesdropping to the message should be protected two disclosure attacks.

3. Integrity: - Integrity provides an access to assets way in such that first authorized users can way to the modify or access information. The ensure integrity user should be original to the transferred information.

4. Authentication: - That participant's authentication means with in network communication are each authorized not fake. The MANET of assets should be access only by the authentication nodes.

5. Flexible to Attacks:- The various types of network functionalities must be maintained, a number of nodes are compromised or lost.

IV.TRUST MANAGEMENT

A measured-representation of characteristic a node of fulfillment measurements trust is a different node of association encounter in system for most part creates in light with a specific time. [9] trust is evaluating on the different ways and different metrics. Some schemes to level of measure trust used are discrete or continuous values. For Example, Trust describe by a measured as a discrete value in [−1, 1] or continuous value in [0, 1]. The threshold-based approaches are used to the measure of trust. Threshold based approaches also are used to measure the trust. The trust metrics such as mobility, fuzzy based, single strength, probability based, similarity, context-based factors like energy, hop distance etc. there are three parts of comprise trust processing: - "suggestion", "experience" & "learning". The part of experience for trust of every hub straight forwardly is measured by kept upgraded and quick neighbors at a normal of the interims in trust table. Recent trust table is a spread each single of another hub a "suggestion" piece of trust. At customary an interim, already trust is assessed incorporated in current segment "learning" of aggregate trust.

4.1 Properties of Trust in Mobile Ad hoc Networks

A trust decision framework should not work under of assumptions that all nodes are support for MANET. The communication load and excessive computation trust should be highly in customizable manner is determine.

- Trust is Dynamic.
- Trust is Dependent on Context.

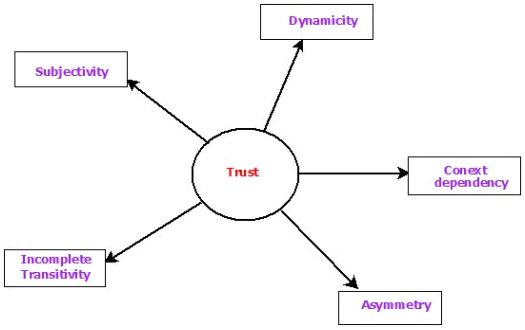

Fig3: Properties of Trust in Mobile Adhoc Networks.

4.2 Trust Evaluations

There are three components of evaluations experience, knowledge and recommendation for every node which is directly measure by immediate neighbors and continuous interval at updated in trust table. The recommendation part of trust is broadcast in all the other nodes in existing trust table. In regular interval the pre-evaluated trust is combine all present knowledge component of all trust. That can be used in the computing trust three components differentiate or integrate.

I. Distributed Trust Evaluations: -Each node calculates its individual value by trusting on its neighbor. It is categorized as hybrid method, neighbor sensing of the direct trust, and recommendation trust based of the indirect trust. For exact action, analysis data collected from observation are planned trust level in distributed ad-hoc networks. it can be log that in normal condition particular node forwards some packet and left other packets. it can be receiving direct sensing from neighbor and also determine trust from straight experience. When the

trust found between the instant neighboring nodes is called direct trust and this trust is used for nodes which form trust relationship in between them without earlier interaction. It can be received second hand information the form of recommendation in Fig 2. This transitive trust is also known as indirect trust. This can be determined on any trust metric behavior of nodes which received from other nodes from brief level. Node uses a hybrid of above two approaches, which is seen in reputation-based on the trust management approaches.

II. Centralized Trust Evaluations: -The trust computation central agent manages or helps the node most on the work of computation centralized trust of establishment in assumption is a trust agent in cluster which can be nearby all nodes by all nodes.

V .ANALYSIS OF DIFFERENT TRUST MANAGEMENT IN MANETS PROPOSALS

Capkun and LeventeButty et al. [10] proposed that allows user generate to perform a authentication of regardless the network partition to issue certificate without any centralize services their (public, private) key pairs self-organized public-key management for MANET. In a mobile ad hoc network (MANET) can be achieve two user's key authentication there are local information if the security is performed way even self-organized. Further the resolution and the detection for exploration of mechanisms of inconsistent of certificates is required, the graph model is certificate of the improvement & exploration of more data management schemes or sophisticated load balancing for Public key management (PKM) in MANETs is not defined. The organism used criteria by a user to object a public key certificate of customer are not providing yet through actual a public key is used to the verification as a trust other node.

Mohit and Upadhyaya et al. [11] proposed the notion of among two nodes define in ad hoc network in a pair-wise trust which quantifying trust in MANET. it is also present scheme as a combination evaluate of pair wise of group trust and self-trust.it also extending described trust-based domains from to the pair wise trust in network. the world and network also serve means as a securely of grouping of nodes into domains within MANETs this helpful would be in establish group in key and would propel distributed be in command of in such networks. A Trust-Based Model comprehensive for adhoc networks, that can be acceptable level of assure security use through of trust is not defined.

Bing Wu and Jie Wu et al. [12] proposed A Secure and Efficient Key Management (SEKM) in MANET that builds by applying by a secret an underlying and sharing scheme multicast server groups. In Secure and Efficient Key Management the server group view of a creates of (CA) and provides of certificate apprise service for the all nodes, cum the server themselves. A scheme of ticket introduced for efficient certificate services. In addition, updating scheme is proposed an efficient server group. A revoked certificate with node need offline or in person before reconfiguration reenters of the network.

Chang and Liang et al. [13] proposed Markov Chain Trust (MCT) model designed for the key management and trust value analysis in distributed multicast for one hop neighbor that determine trust value (TV) of the MANET. A node's TV is analyzed from its previous that was trust manner performed in this group. Second, the node among highest TV in a group will be particular as a CA server. The next highest TV to increase reliability with node will be particular as a support CA that will receive server over CA while CA fails. The trust value described is not clearly measurement.

Dahshan and James et al. [14] proposed A Robust Self-Organized Public Key Management for MANET of (RSKM) in which the measure of correspondence cost of the endorsement chain disclosure method has been proposed. The main commitment is that this plan has little correspondence cost because each node that every node restrains its look for the endorsement ties to its straightforwardly trusted nodes as it were. The second commitment is that the utilization of trust esteems alongside general society enter declarations in no less than two autonomous endorsement chains improves the validation of the proposed key administration plot. The third commitment demonstrates that random graph hypothesis reasonable for overseeing trust in the mobility environment of MANET. In any case, this plan creates high communication above and deferral on behalf of source to acquire a goal of public key .

Chauhan and Tapaswe et al. [15] proposed A Secure Key Management System in Group organized MANET anywhere a key administration approach for MANETs by no trusted third substance is characterized. This works utilizes group leaders as a CA to administer key creation and conveyance. The gathering pioneer is capable to produce and distribution identifications and open private key of the pair of nodes. This technique decreases the amount of keys to disseminate among the nodes. Notwithstanding, group leaders of selection is done by the haphazardly, without thinking about its dependability and particular assault practices.

Chen and Cho et al. [16] proposed A Survey on Trust Management (TM) for MANET that characterizes the ideas and properties of trust and some extraordinary attributes of trust in MANETs. A Review of trust administration plans created for MANETs and by and large acknowledged orders, potential assaults, execution metrics, & trust metrics in MANETs is likewise characterized. The attractive ascribes, for example, capacity to adjust to natural dynamic, scalability, dependability, and configurability is not legitimately decided.

Cho and Chen et al. [17] proposed model and examination of trust administration with trust chain improvement in mobile adhoc systems, a trust management protocols for mission-driven gathering correspondence networks in mobile adhoc systems utilizing various leveled modeling methods. A trust metric for group communication mission-driven systems in mobile adhoc systems to appropriately reflect one of a kind attributes of trust ideas and exhibit that an ideal trust chain exists for length producing the most precise trust levels for trust-based cooperation among peers in mobile specially adhoc systems while meeting trust accessibility and way unwavering quality prerequisites. The unpredictability issue of the tradeoff between confides in exactness and asset utilization (i.e., communication overhead) in MANETs by way of the length of the trust chain increments is not characterized.

Zamani and Zubair et al. [18] from the security point of view the traditional networks the key management plan given but it is not accept by MANETs, this is mobile adhoc network. Novel techniques, is designed for particularly for MANET, are required. in this area key management is an important which is required resolution but before high deployment of ad hoc network is practical it is not possible every time to compare well manner way that assume the exits of certified authority which are self-organized fully.

Anugraha and Krishnaveni et al. [19] proposed Recent Survey on Efficient Trust Management in MANET. A trust among nodes is very important for communication in network. From the communication point of view, it is important trust in among all nodes. Which is in MANET of the trust management in mobile which is found recently Selfish and malicious nodes is affected by trust node. Connectivity, Energy, Unselfishness &

Healthiness all this parameter and self-centered nodes are predicted. Management protocols are minimization of trust bias and maximize application Efficiency. It is performed and development to secure routing in the network. The data dispatching is impossible in a short of the period time.

Manjula S and Suresha [20] proposed this topology is no fixed networks to enhance the coverage area and obtain to the global type services these other networks can be join of MANET. The heterogeneous networks for the combination of intermediate one which a gateway is used a hybrid network. In MANET, the data communication during also play a crucial part the security issues since sender of the sink. It used to the AOMDV routing technique to limitation of the normal AODV routing protocol for integrating of MANET by internet provide security of data decryption and encryption on the concentrated and gateway selection the adaptive gateway technique.

Jay Prakash, Rakesh Kumar and JaweriaUsmani [21] proposed mobile ad hoc network (MANET) is a wireless network so need connect to the internet with any interface which provide route toward the internet that is called the gateway. The network operation which degrades is loss due to the dynamic topology packets. So high throughput security delineation achieved on the internet gateway are applied which helps adversarial environment to the out from. There is security aim is discussed (authentication, Confidentiality, non-repudiation and integrity) which extend operation of the ad hoc network. the main objective this paper without security and with security through the gateway discovery scheme basis of the multiple execution parameter like throughput, Routing Overhead, Packet Delivery Ratio & End to End delay & then conclude if one is better. MANET is leading among wireless technology but due to the no centralized design, security becomes a major issue. So several security scheme applied among is the signature scheme or nodes on the gateway that be dependent on trust.

Mohd.ShariqueKhan, and Dr.Vishnu Sharma [22] this survey paper of basically represent on the (AODV) Adhoc On-Demand Distance Vector algorithm to investigate or explained to the (ACO) Ant Colony Optimization in MANET. Here, in network routing we widely used to the two optimization techniques, first one is (ACO) Ant Colony Optimization and second one is swarm intelligence based on the optimization techniques. On-demand routing protocol is most scalable, adaptive and highly potential.

These swarm intelligence (SI) and ant colony optimization (ACO) based techniques will be use design of the mathematical errors and swarm ability to engineering. These are types of networks flexible or soft, any kind of base or infrastructure of the existing central administration will not require networks. Therefore, MANET are those types of networks, it is consisting of the completely of the infrastructure less nodes which work is the concurrently and appropriate or also suitable in an adhoc way for temporary of the communication links in design of the major aim protocols was decrease overhead for the routing. Mobile ad-hoc networks (MANET) are set of the mobile nodes always communicate in air either fly over the radio waves. Ant colony optimization routing in urban environment have ability of the easy ants solve to a complex problem. Thus, ant colony optimization (ACO) routing is better and efficient algorithm find of the optimal shortest path (OSP) in between starting point to end point with MANET.

Table 1. Analysis of Different Trust Management in MANET

PROPOSAL	TITLE	METHOD	METRICS	KEY MANAGEMENT SCHEMA	TRUST EVALUATION	DRAWBACKS	SECURITY REQUREMENTS
Capkun and butty et.al.[10]	Self-Organized Public-key Management for MANET	Allow users to ganerate key pairs, to issue certificates without any CA	Performance , Key usage , Comm cost.	Symmetric key management	Not defined	Criteria used by a user to issue certificate of another user is not provided.	Authentication, confid entiality
Mohit and Upadhyaya et al. [11]	Quantifying Trust in Mobile Ad-Hoc Networks	The notion of pairwise trust between two nodes is defined	Trust value evaluation , time , trust update	Not defined	Defined	Admissible level of security through the use of trust is not defined.	Authentication, Integrity, confidentiality
Bing and Jie Wu et al. [12]	Secure and Efficient Key Management in MANET	SEKM builds PKI by applying a secret sharing scheme.	Trust value , No. of rounds	Symmetric key management	Not defined	A node need offline or in person reconfiguration before reenter the network.	Authentication, Integrity, confidentiality
Chang and Liang et al. [13]	MCTM for Trust-Value Analysis and Key Management in MANETs	Determine the trust value (TV) for each one-hop neighbor	Trust value , No. of nodes Reliability.	Group key management	Well defined	Measurement of trust values is not clearly described.	Authentication
Dahshan and James et al. [14]	A Robust Self-Organized Public Key Management for MANET	Measure of comm.cost of certificate chain discovery process has been proposed	Packet delivery ratio, e2e delay, No of certificates deliver.	Asymmetric key management	Not defined	High communication overhead and delay.	Authentication, Integrity confidentiality
Chauhan and Tapaswe et al. [15]	SKM System in Group structured MANET	Key management with no trusted third entity is defined	Trust value , e2e delay , comm. cost	Group key management	Not defined	Group leader selected randomly, without considering its trustworthiness.	Authentication, Integrity, confidentiality
Cho and Chen et al. [16]	Survey on Trust Management for MANET	Trust management schemes developed.	Trust level ,delay, packet dropping rate, overhead, throughput	Not defined	Well defined	ScalabilityReliability Reconfigurability is not determined.	Authentication, confidentiality
Cho and Chen et al. [17]	Modeling and analysis of trust management with trust chain optimization in MANET	TM protocol for mission driven group comm. using hierarchical modeling techniques	Trust value , time , Path reliability , length of trust chain	Not defined	Well defined	High communicatio n overhead	Authentication, Integrity confidentiality
Zamani and Zubair et al. [18]	Key Management Scheme in MANET	Different key management schemes defined.	Not used	Asymmetric key management	Not defined	Not always possible to compare	Authentication, confidentiality
Anugraha and Krishnaven i et al. [19]	Recent Survey on Efficient Trust Management in MANET	Trust based protocols which obtains the trusted routing in malicious and selfish nodes is defined.	Trust establishment and update , trust value , delay	Not defined	Well defined	Does not detect the selfish andmalicious node outside of its radio range	Availability, Authentication, Integrity confidentiality

VII.CONCLUSION

Mobile adhoc networks (MANETs) are highly vulnerable so many attacks as a dynamic topology used in mobile adhoc networks (MANETs), its distributed operations of limited bandwidth. We have discussed about MANETs and it's only some characteristics, security goals, some of its applications, advantages challenges, and types of

security attacks in mobile adhoc networks. Its management and Trust are research of moving field. An around trust provide rich writing developing us a solid sign this is a critical region of research. Trust as an idea has a wide variety of adjustments and applications, which cause deviation in trust in management of the terminology. The goal is provided designers by multiple perspectives of trust on the concept of the MANETs, That should be present an understanding the properties considered developing a trust in metric & insight on trust can be calculated. Security in networking is as a rule dependent to appropriate key management. A centralized approach in key management may not be present, therefore distributed approach is utilized. Non-repudiation is one of0theimportant security issue whish ensure the sending and receiving of specific information. The exertion has been made on the relative investigation of all recommendations in regards to trust and key administration in MANETs and has-been introduced as table.

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