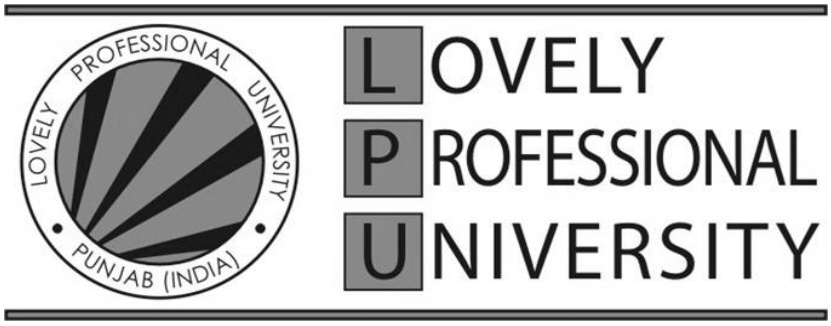

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An Enhanced technique to improving Anomaly-Based IDS security in MANETs

A Dissertation submitted

By

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to

Department of Computer Science

In partial fulfilment of the Requirement for the

Award of the Degree of

Master of Technology in Computer Science Engineering

Under the guidance of

Asst. Prof. Ravi Shanker

(12412)

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Approval of PAC

LOVELY PROFESSIONAL UNIVERSITY

School of: SCE

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ABSTRACT

Each time network system increases awareness of technology but not the security. Due to Continuous Development & Competition in IT, increasing use of complex computer infrastructure, increasing use of network elements & applications and decreasing level of skill set. When any Security breach in the computer system of any person, corporates or government IT systems then increases the risk. Network information systems needed robust securities against intrusions or malicious attacks in an information system. Statical security is an essential part of ad hoc networks. Each mobile device can move freely in any direction, and changes their links to other devices frequently. In black hole attack, the malicious node advertises itself as having the shortest path to the destination and falsely replies to the route requests, and drops all receiving packets. The anomaly detection of IDS will detect more malicious nodes. In this research paper presents secure, fast, efficient and optimized data delivery from source node to destination node and the behavior of interconnected nodes. Here it will be a decentralized authentication, which will be found on the data routing tables and study that conducted to IDS (Anomaly based Intrusion Detection System) based on process, significant, identification and make an optimized decision against intrusions. This proposed schema will helps to boost the protection in the MANET and make the network more reliable.

CERTIFICATE

This is to certify that **"AMAN KUMAR"** has completed M.Tech dissertation proposal titled **"An Enhanced technique to improving Anomaly-Based IDS security in MANETs"** under my guidance and supervision. To the best of my knowledge, the present work is the result of her original investigation and study. No part of the dissertation proposal has ever been submitted for any other degree or diploma.

The dissertation proposal is fit for the submission and the partial fulfillment of the conditions for the award of M.Tech Computer Science & Engineering.

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Last but not least, I thank the Almighty, God for his blessings who helped me throughout my study of my dissertation proposal.

AMAN KUMAR

DECLARATION

I hereby declare that the dissertation proposal entitled, **"An Enhanced technique to improving Anomaly-Based IDS security in MANETs"** submitted for M.Tech degree is entirely my original work and all ideas and references have been duly acknowledged. It does not contain any work for award of any other degree or diploma.

Date: **_____**

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CHAPTER 1
INTRODUCTION

An IDS system for maintaining accessibility, protecting the whole network etc. i.e. protect by Authentication, Confidentiality, Integrity, Non-repudiation and Availability of network systems against their wrathful packet from either insiders or intruders. It is binding of two major primary needs. One interested is visible for security policy it know the nature of traffic in network that access by nodes. Another is a control that makes action against compliance through security policy. In there, if intermediate node i.e. hops connection fails in that a data packet doesn't reach the destination. Sometime connection is buffering, due to busy of destination host. IDS detect the malicious nodes when Source node transferred the data packet in routed internetwork and the destination node receives it and destination not replies the ACK to the source node. In their source node again retransmit the same data packet to destination. In the purpose of security, IDS is widely used as second wall of defense and secure, worthful private networks. An also IDS (Intrusion Detection System) prevent of networks when malicious nodes wants access the data file either modification or corrupt it through attacking. It has collected audit data in table form continues updated by IDS that it works as seems like agent in which analyzes, audit data and creating report related to gathering issues.

This kind of detection (IDS) would receive packet data that develop and try to attack in last few years ago. This much growth of internet and the increase bulk of users in network systems exist in any govt. or private corporates. An IDS comes in data mining has become much applicable in latest. Here, more beneficial of Intrusion detection to practical area of monitored mining data of file. IDS take monitors and analyzing information from various defined areas within a computer or network systems to identify one of the possible security breaches, which imply both misuse and intrusions. So that, Anomaly IDS is the graduate process of auditing, analyzing and preventing the data packet and events would occurring to the network or computer system in order to detect all kind of attacks, vulnerabilities and other major security problems. In host-based detection, data, files and packet processes of the host node are directly monitored to determine perfectly which host resources are targeting of a precious attack. In contrast, network-based detection of intrusion that monitors traffic of network and data using a set of sensors attached to network for capture any types of malicious activities. Network or computer securities

problems define vary widely and could affect different mode of security requirements, including authentication, authorization, non-repudiation, integrity and availability. Intruders and insiders could cause different types of malicious attacks such as Denial of Services (DOS), DDoS, sniffer, jamming, spoofing, compromises, Trojan attacks, worms and viruses [1].

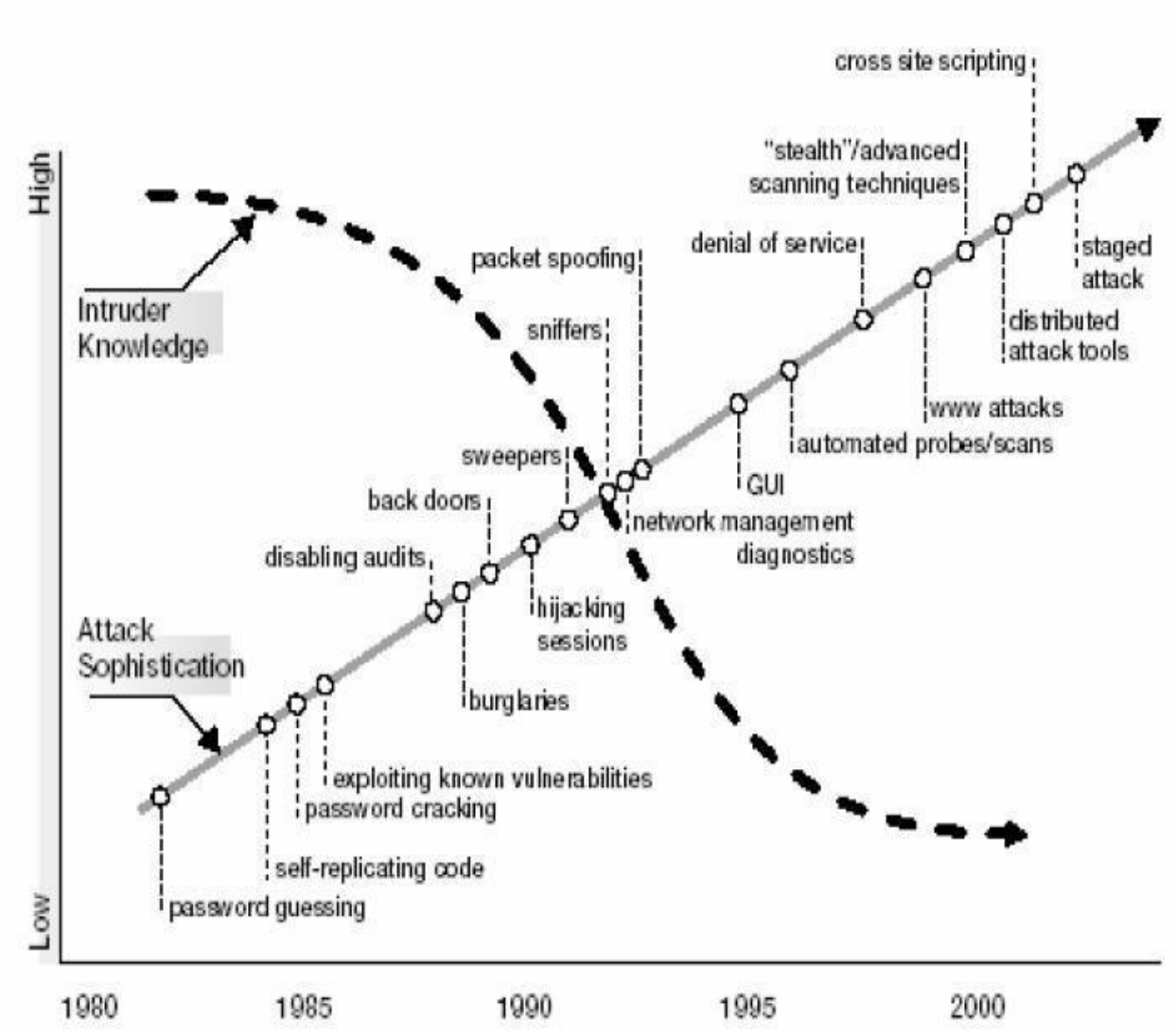


Fig1.1: Need of Security

1.1 What is intrusion?

Any Security breach in the website or network or computer of any person or company increases the risk of the public revenge or steal the data from company or government operation systems. It is an illegal and unauthorized access of network or computer systems. It increases the un-structural area to steal the information technology. They develop new techniques to break into a

computer system. It has kind of logical and mathematical concepts that develop a new program and then attempt to breach the network security and hack the defense wall from remote locations. They are try to gather old, unpatched as well as recently developed eavesdropping technique in network information systems and tools, protocols and breach either network traffic or operating system or both[16].

1.2 Who are the potential intruders?

Following are one of the most common intruders for a reliable network because have become more ubiquitous in today, source from [17]:

1.2.1 Internal Employees

These are the employee they have worked in information system and studies in wide area of network information system as professional. They have knowledge of organization or any work place and try to damage of data, file or operating system of their. His activities of hacking try to hacking and stealing of their data. They also try to generate fraud and forgery program to break of network systems.

1.2.2 Hackers

Hacker is more danger kind of intruders to hack and crack organizational data systems through internet and electronic devices. She/he accesses the network link to break and steal the data into victim computer systems. They detect the victim computer IP and handle the victim computer systems by it in remotely. Generally hackers break the network policy and privacy.

1.2.3 Black-Hat Hackers

Black-hat hacker has much danger to breaks the victim system or network. They damage or change the id or password of victim's internet accounts and steal files for future purpose. They break of network and hack for the public without notifying the victim. It has at least 10 year experiences in a computer system or network. They are cyber-crime and cyber terrorist their main work is to generate money from various illegal activities like credit card frauds, child pornography, cyber violence and some more. E.g. – UNIX terrorist.

1.2.4 Gray-Hat Hackers

Gray-hat hackers are half kind of danger and they have purpose to develop hacking program and publishing them for the purpose of both black-hat hackers and also software developers. But will use either wrong direction or right who exploit these vulnerabilities to their needs of money earning. Therefore, these are the half devil and half angel kind of hacker. E.g. – ZooZoo hacker.

1.2.5 Script Kiddies

Script Kiddies is the type of novice programmer hack script users. They do not have the knowledge and technical skill about hacking to Internet information resources but they still do. These types of insider try to use programming script as available free of cost in internet. These intensive programs are potentially harmful. E.g. – Purpose of revenge and impressing girlfriend.

All these kind of attacker could do an attacks, eavesdropping or vulnerabilities etc. as viruses/ worms attacks, Trojans attacks, Black hole attacks, Gray hole attacks, packet dropping, wormhole, email/ARP spoofing, Mail spoofing, email hijacking, denial of services (DOS) attacks, DDOS attacks, Malicious flooding, Data diddling, Salami attacks, logic bombs, web hijacking, phishing, pretexting, vishing, cyber-stalking, cyber-squatting, cyber defamation, financial crimes, Internet Time theft and also more through digital devices.

1.3 Sources of intrusions

The most of intruders could get the information from various kinds by systems or physical access-

1.3.1 Physical Intrusion

In this source the intruder access the network by physically and change boot operation data of any electronics devices like hard disk. Most of BIOS have boot protection program. Basically all the BIOS have ID and backdoor password against intruders. E.g.- CCTV Monitor, Counters, Sensors.

I1.3.2 System Intrusion

System intruders involves in the networks that the purpose for consign the network link with little privilege. They have not authorized user for the access of network system. But they used it with authorized access. Then it changed the higher privilege in exploit of recent used.

1.3.3 Remote Intrusion

These are one kind of unauthorized sources that involves hacking and gather the privilege would try to remotely access the system. This has no permission to access the system but still they do. An intruder first scans the port id and checks the hardware address, match with cryptographic generated password. Wireshark, tcpdump, nmap, capinfos, RAT, Snort, kfsensor, Tshark etc tools are help the intruders the break the privilege of network systems.

1.4 Types of Intrusion Detection Systems (IDS)

Numerous types of IDSs exist and each of generally classified as either a network-based, host-based, or node-based IDSs-

1.4.1 Network-based IDSs

Network-based IDS appliances are typically dedicated systems that placed at strategic on a network to extracting data packets to determine if they have coincide with known attack look like signatures. To compare examined packets with known type of attack as network-based, signatures IDS appliances uses a mechanism referred as to passive protocol analyzing, to monitoring, or more of "sniff," all type of traffic on a network and to detecting low-level events that may be occurred inclusive from raw traffic of networks. Network-based IDS system appliances audits the contents of data packets by parsing frames and packets and analyzing individual packets based on the protocols used on the network. Passive monitoring would normally performed by the network-based IDS appliance by implementation of "promiscuous mode" access of a NID (Network interface device).

A network interface device has operating in promiscuous mode captured copies packets directly from the network media, example as a coaxial cable and 100baseT or other transmission medium, regardless of the destination host to which the packet would addressed. Accordingly, there is no more simple method for transmitting data packet across the network transmission medium without the network-based IDS examining it and thus one interested the network-based IDS appliance may packets information gathering and analyze all network traffic to which it is exposed. Upon identification of a suspicious packet, i.e., the captured packet that has attributes corresponding to a known type of attack as signature to monitored for occurrence by the

network-based IDS appliance, an alert may be generated thereby and transmitted to a management module of the IDS so that a networking expert may implementing security measures. It appliances has the additional pros of operating in real-time and thus it could detect an attack as it is occurring.

1.4.2 Host-based IDSs

Host-based IDSs detect intrusions by monitoring or examine application layer data packets. It's employed a brilliant agent to continuously viewing computer or network audit logs for malicious activities and get compare each change in the logs to the library of attack signatures as well as user profiles. These IDSs may poll key of system packets or files and with patchable files for changing of unexpected. These IDSs are referred to as such gather packets because the IDS utilities reside on the computer system to which they are assigned to prevent and protect. Host-based IDSs typically employ application-level packets monitoring techniques that examine the application logs maintained by various tremendous applications.

For example, A Host-based IDS might monitor a database engine that logs failed to access attempts and/or any modifications to system configurations. Alerts might be provided to a management trusted node upon identification of occurring events read from database log that has been identified as suspicious as well as malicious. Host-based IDSs, generally, generate very few false-positives. However, These IDS such as log-watchers are in general has limited to identifying kind of intrusions that have already taken place with also in limited to events occurring on the single captured host. Because log-watchers rely on monitoring of application logs, any damage resulting packets from the logged type of attack would generally has taking place by the time the kind of attack has been identified and gathered by the IDS. Some host-based IDSs has perform natural intrusion-preventative mode of functions such as 'hooking' and 'intercepting' operating system as application programming that interfaces to performs execution of preventative operations technique by an IDS based on network layer as application layer activity that might to be intrusion-related. Because an intrusion detected and prevented to this way has already bypassed any kind of lower level IDS and it represents a final layer of defense against network or network system exploits. However, These IDSs most of little uses for detecting and gathering low-level network events as protocol events.

1.4.3 Node-based IDSs

Node-based IDSs examine the intrusion detection as well as prevention technology on the system being more protected. An interesting example of these IDS technologies is detection of inline intrusion. In this may be implemented at each and every node of the network range that is desired to be more protected. Inline IDSs comprise intrusion detection techniques that have embedded in protocol stack to the protected connected node. Because the inline IDS is embedded through the protocol stack, both of inbound and outbound packet data would passes through, and it be subject to monitoring by, established inline IDS. In these inline IDS overcomes various kind of the inherent cons of network-based result full solutions.

Inline intrusion detection and prevention systems, however, only monitor that traffic who directed to the connected node on which the inline IDS has installed. Thus, attack packets couldn't physically take bypass an inline IDS onto targeted machine because data packet must pass through associated protocol stack of the milestone device. Any bypassing of the inline IDS by a gathered of attack packet must be destroy entirely by 'logically' bypassing the interesting IDS, i.e., an attack packet that has evades an inline IDS must take to do so in a manner that list of causes the inline IDS to fail to identify and also improperly identify, the gathered attack packet. Additionally, inline IDSs provide the hosting node with low-level monitoring and detection capabilities similar to that of a network IDS and may provide protocol analysis and signature matching or other low-level monitoring or filtering of host traffic. The most need for advantage offered by inline IDS technologies is that attacks are detected as they occur. Whereas host-based IDSs determine attacks by monitoring system logs, inline intrusion detection involves monitoring network traffic and isolating those packets that are determined to be part of an attack against the hosting server and thus enabling the inline IDS to actually prevent the attack from succeeding. When a packet is examine to be kind of an attack, the inline IDS layer may have discard the packet thus preventing this packet from reaching the upper layer of the desired protocol stack where damage may be caused by the various attack packet an effect that essentially creates a bust local firewall for the server hosting to these inline IDS and protecting it from kind of threats coming either from an external network system, such as the oriented based Internet, or from within the established network.

Types of IDS	Types of malicious Activity Detected	Scope per sensor of agent	Strengths
Network-based IDSs	Transport, application TCP/IP layer and Network activity	Multiple subnet in network and hosts group	Able to analyze the widest range of application protocol, only IDPS that could thoroughly analyze many of them.
Host-based IDSs	Host application and operating system activity, network, transport and application TCP/IP layer activity	Individual host	Only IDPS that could analyze activity that was transferred in end-to-end encrypted communication.
Node-based IDSs	Network, transport, and application TCP/IP layer activity that causes anomalous network flows.	Multiple network subnets and groups of hosts.	Typically more effective than the others at identifying reconnaissance scouldning and DoS Attacks, and at reconstructing major malware infects

Table1.1: Comparison of types of IDS Technology

1.5 Understanding the comparisons between IDSs & firewalls

IDSs and Firewalls are both appropriate tools in system for protecting to corporates from intrusions as well as insider. It needed, generally they are each of designed to seen at different things:

a. A firewall has designed to block every kind of network traffic except that they explicitly would allow.

b. An intrusion detection & prevention system is built to permit each and everything that except to who is explicitly not allowed.

c. A firewall is built to grant (or block) system packets based on their communicated source device, destination, as well as port number, concern of the contents of every packet data payload (the contents of the message).

d. An IDSs is built to grant (or block) network traffic packets based on the data packet's payload.

1.6 Intrusion Detection Prevention System Technique

All kind of intrusion detection prevention system use through the three prevention technique:

- Signature based IDPS
- Anomaly based IDPS
- Stateful Protocol Analysis IDPS

1.6.1 Signature-Based Intrusion Detection Prevention System:

The signature based IDS are more popular of known attack. They identify those attacks who address or extension stored in signature based IDS system. E.g.- Antivirus. These are a lot of IDS using misuse detection and prevention would only detect known kind of attack. It is easily implies to usually examine the known traffic packets with predefined intrusion detection system i.e. signatures and each analyzing of network traffic, systems also updating the database. But it could be known that misuse detection needs specific knowledge of abnormal/ intrusive behavior. Gathered data before the malicious could be not in expected date and yet to many times it has rigid to detect newer or unknown attacks. Signature-Based Intrusion Detection Prevention System has a well-known prevention of avoiding alerts messages of the outcome. For example a malicious malware or spyware intrusion trying to attack a network system as windows operating system, the improper use IDS would send so many kind alerts for unsuccessful alarm of attacks which may be complex to detect and block it.

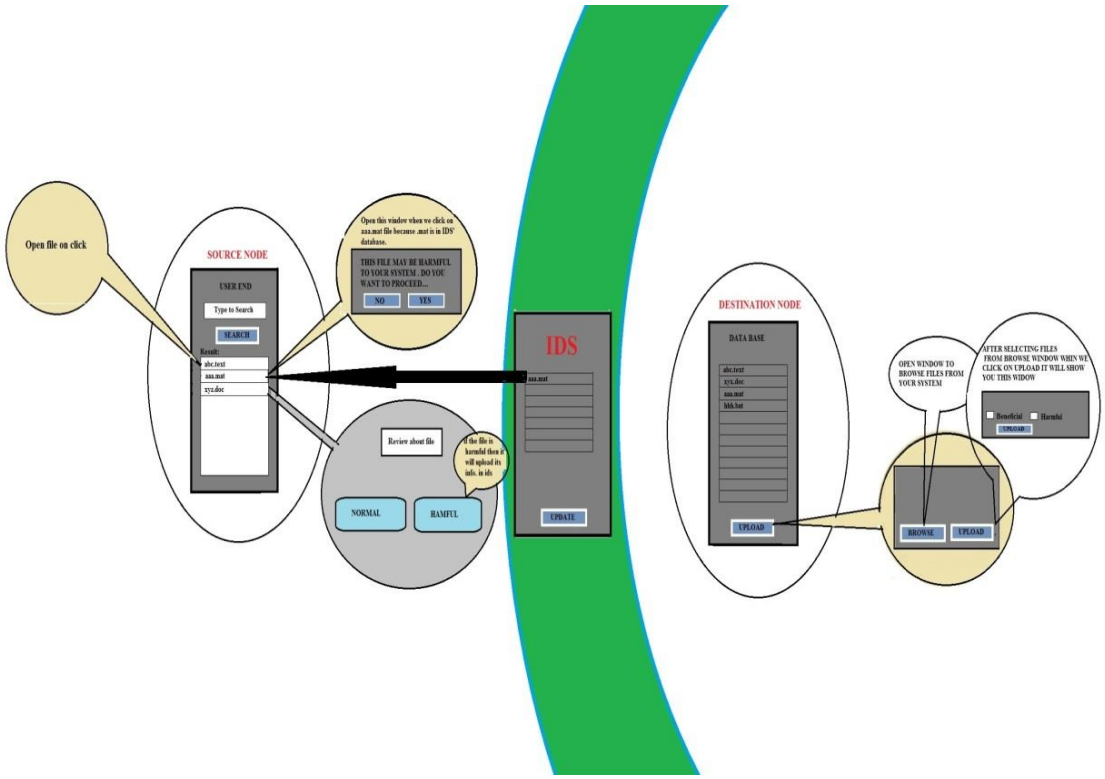


Fig1.2: Signature-Based Intrusion Detection Prevention System

1.6.2 Anomaly-Based Intrusion Detection Prevention System

Anomaly detection uses to behavioral intrusion detection and security has been a kind of active area of research. These kinds of detection techniques use desired advantage that it could monitors new and unknown coming intrusion as determination as abnormal natures of intruders. This concept is generating on metrics such credential as the coming traffic rate, the number of traffic packets that communicating for each protocol. In this problem, there has to give a set of human behavioral data to get make, and identifying an interesting new set of preserve data to take much the normal generated data of system. The desired challenges of the IDS are to performing and capturing whether the optimized data belong to either “normal” or “anomalous” kind of behavior. Anomaly-Based Intrusion Detection Prevention System suffers from high rate of generated false alarms. Network generated false alarms would be find determination while previous more unknown collection of system having anomaly recognized.

These kinds of intrusion detection triggers generating an alarm on the IDS when some kind of unusual behavior occurs onto the network. This would include any kind of event, kind of state,

kind of content, or behavior that has considered being abnormal by not defined and examine of standard.

In network information security, this one is big challenges among the researchers. Every day people and researchers are working in computer field and due to use of technology is help to increase of associated risk in information securities.

This paper is focuses on anomaly analyzing the decentralize connection of moving digital devices that has been abnormal detected of malicious node by our Anomaly based IDS. As a result, the behavior profile would contain intrusive behavior, which is not detected as anomalous.

1.6.3 Stateful Protocol Analysis Intrusion Detection Prevention System

This kind of IDPS system generates inspection on the functions of filtering of data packet by tracking the state of determining connections and blocking data packets from the expected state. A stateful protocol analysis (SPA) is a detection process of differtiating pre-determined abstract of generally usual calculating of begging activity for every protocol state verses observed performs to identify deviations of network traffic. Thruogh storing relevant packet data detected in a given session and then implies that data to monitored intrusions that inclusive multiple term of requests and responses.

Now a recent time various kinds of Intrusion detection techniques are normally available, according to their security goals and considerations by organization. It performs kind of features. But Anomaly-Based Intrusion Detection Prevention System is very big challenging in a present day. There are no strong full anomaly intrusion detection techniques are available that detected the malicious intrusion in network information traffic.

1.7 Data Mining Could Help in IDS

Data mining might help to improve to the process of detection of intrusion by adding a level of parametric concept or logical concept to anomaly detection. By identifying and creating bounds for appropriate network activity, it would aid an analyst in abnormal ability to distinguish kind of attack activity from common in everyday packets traffic on the network. Data Mining could help IDS in the following prospects as variants, false positives, false negatives, data overload.

Variant: Since IDS as anomaly detection is neither based on predefined signatures nor known process collecting traffic that concern with variants in the code of traffic of an exploit are

unknown as great since we would looking for abnormal activity compares a unique signature. For example it might be the RPC (Remote Procedure Call) buffer overflow to exploit whose code have been modified it to evade an IDS using signatures.

False positives: In thinking to false positives there have been many work to determine it if data mining could be implies to identify sequences of generate alarms in order to help and identify valid network activity which could be traffic data has filtered out.

False negatives: Detecting of kind of attacks for whose there are no pre identifying or known signatures. Through attempting to establishing traffic based patterns for normal activity and identifying/gathering that activity which implies outside identified cost of bounds, attacks for which known based i.e. signatures has not been generated might be detected.

Data overload: These concept of data mining has sure to reward a big role is in the process of data reduction. With recent generating data mining algorithms there existing the more capability to identifying or extracting traffic data which is most appropriate and provide monitored with different "views" of the data to falls in their analysis.

1.8 Problems with Existing Intrusion Detection System

Most of the present intrusion decision systems (IDSs) have in signature-based systems like antivirus. The signature (Misuse) based IDS looks for clearly define as signature to match patterns in network traffic identified files, then it detect the malicious nodes as well as packets as intrusion. When signatures looks like patterns provided, they able to detect all known kind of attack patterns, but they have exciting problems for unknown attacks. The rate of false positives and variant in small but these types of detection systems are merely poor at detecting new kind of attacks, variations of known attacks and an attacks that could be skulled as normal behavior. Statistical Based Intrusion Detection Systems (SBIDS) could have many of the mentioned pitfalls as IDS of signature based. To monitors an anomaly packets on the network. As network system attacks have increased over the past years ago, intrusion detection system (IDS) is becoming a widely implies measure for security of information and network. Due to large volumes of sensitive data over the network as well as one of the bust complex and dynamic

properties of insider or intruders, improving the wide performance of IDS becomes an important open problem and need more attention from the research community.

Data mining in intrusion detection systems (IDSs) have identified high accuracy, good generalization to novel and new types of intrusion; good performs of classification of very normal and malicious behavior, and robust behavior in a changing of normal environment in recent years. Still a large problem faced by them is intensive computation needed in the model generation to specific phase.

1.9 What is MANETs (Mobile Ad-Hoc Networks)?

Wireless Ad-hoc networks is organized Mobile Ad-hoc network (MANETs). MANETs are one of the best future wireless networks, which are laid entirely of roving nodes that intercommunicate without base stations and also without access points. Nodes generate for both, one is who want to access and next traffic where passes the application to follow up protocol like network control and routing. It consists of nodes for collaborating to supply more flexible connectivity and is loose to move within networks range. These moving nodes can connect and join online networks at anywhere, anytime and lay receive and pass in network traffic. Due to large scale grows of internet made communication in highly data sharing computing. The source node establishes the connection directly or indirectly with the help of intermediate nodes. An Intermediate nodes providing flexible, safe, reliable and mobilitable trusted connection between a root node and destination node. Day to day growing of wireless network security is becoming more important and the vital issue. After having excited kind of characteristics, it possesses also a great deal of events. Because of traffic compactness, routing in a right manner is the biggest challenge. Monitoring system and detecting violations due to the flexibility is new security challenge. We can say that MANETs suffers from connectivity, changing, collision interference, partitions of the network, higher error rates, limited bandwidth, and power consumption mostly in design to specific networks group of rules at the time in routing maintain desired Quality of services (QoS).

Each and every electronic device in a Mobile Ad-hoc network (MANET) is freely to move independently within range in any direction, and would therefore it would change its links that to another devices frequently. Each device has forward traffic in unrelated to its personal use, and

therefore protocol is a router. The basically challenge in designing a MANET is equipping every device to maintain the network information system required to properly routing of traffic.

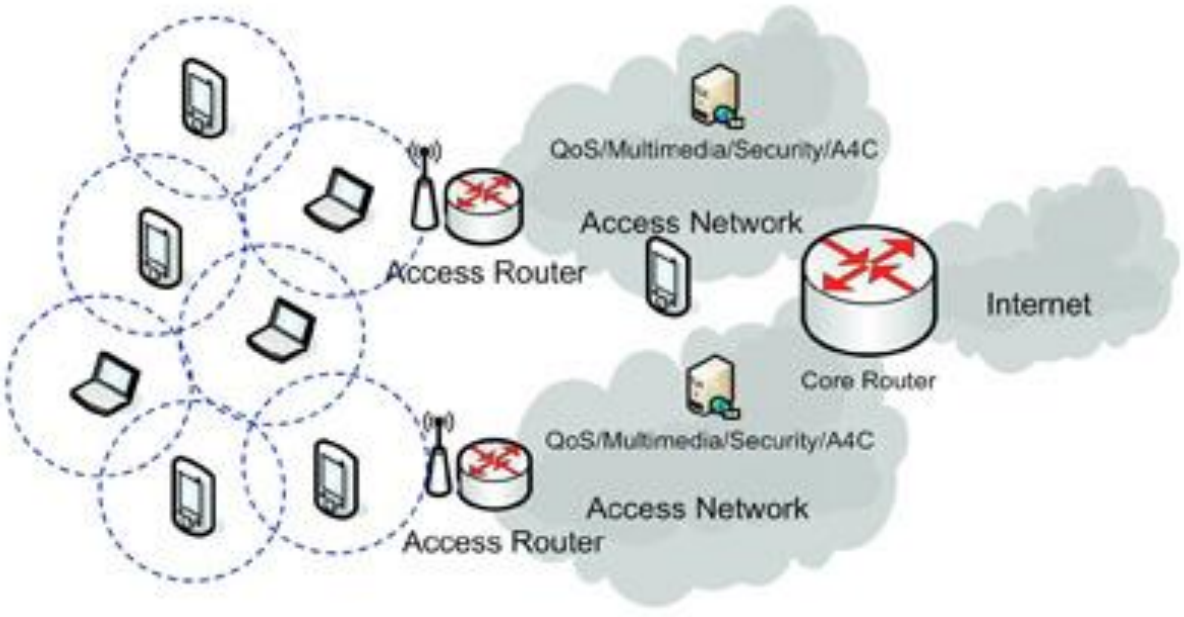
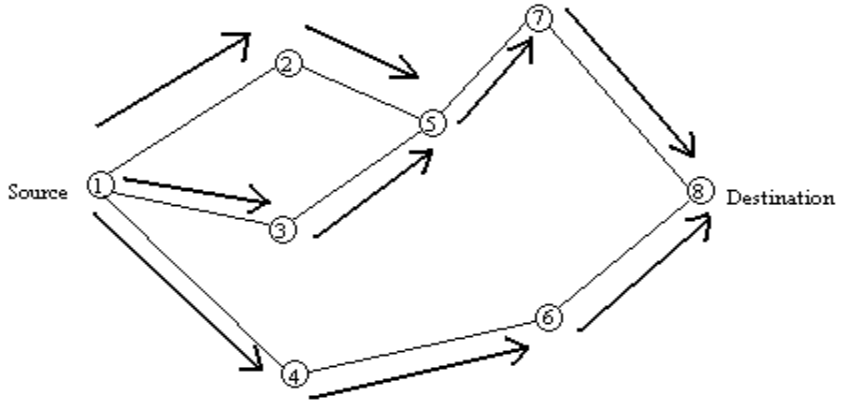


Fig1.3: Architecture of Mobile Ad-hoc Network [Source from [18]**]**

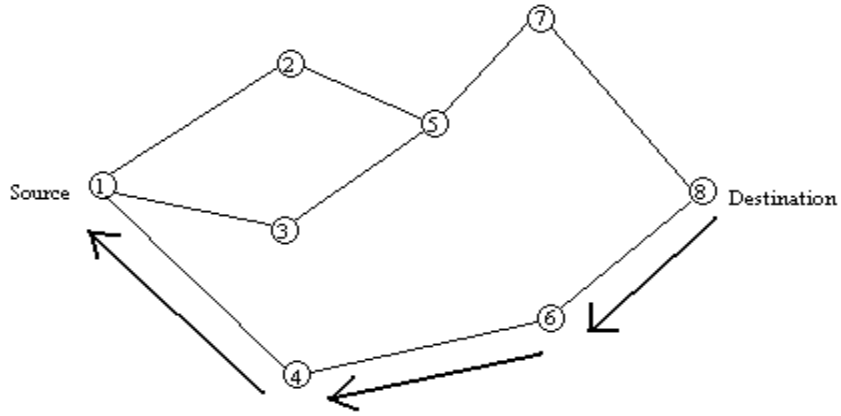
1.10 Ad hoc On Demand Vector Routing Protocol (AODV)

An AODV (Ad hoc On Demand Vector Routing Protocol) is a kind of routing protocol that is implies to develop by the DSDV concepts. It would improve on the base of DSDV technique and typically minimize the many needed broadcasts by designing based on - demand concepts.

These on till it reaches the source node upon that in which the source node could re implies route discovery if needed.



(a) Propogation of Route Request (RREQ) Packet



(b) Path taken by the Route Reply (RREP) Packet

Fig1.4: Route Discovery in AODV protocol

1.11 Challenges in Routing with Mobile Ad hoc Networks:

- **Asymmetric Links: -** There are many wired networks rely on the symmetric associated links which always centralize in nature. But this is not a fare with mobile ad-hoc networks as the associated nodes are mobile freely and changing their position continuously within area of network
- **Routing Overhead: -** In mobile ad hoc networks, nodes often freely change their location within network range. So, many stale routes are built in the generated routing table which leads to access unnecessary as routing overhead.

- **Interference: -** It is one of the major challenges with wireless ad-hoc networks that links receive and send depending on the nature of transmission. In one transmission might interfere take place with another one and node might take overhear transmissions of information of other associated decentralize nodes and could damage the total transmission.
- **Dynamic Topology:** Some topology is not stable. So the movable node might move or medium characteristics may change. In mobile ad-hoc networks, generated routing tables must reflect of their changes in topology constraint and routing algorithms that has to be adapted in nature.

The easily deployable and decentralized nature of ad hoc networks presents various problems that are currently addressed by the research community. Some of the key problems include limited wireless bandwidth, complex routing techniques due to mobility, energy consumption problem, and higher error rates in the wireless channel and information security in ad hoc network. Bandwidth allocation is even more challenging in ad hoc networks as the nodes need to forward packets of other nodes in addition to their own packets. Hence, efficient allocation techniques are needed at the data link layer. Various standards have emerged that address the problems at the data link layer. Since ad hoc networks comprise of nodes that have limited power, the communication range of each node is limited. A node which wishes to communicate with any other node out of its communication range has to do so using multi hop routing. This kind of routing looks similar to the routing in wired networks, but the routing gets complicated when mobility comes into picture. Mobile ad hoc networks have a dynamic topology and hence the path followed by a data packet to reach its destination varies frequently due to mobility or the uncertainty of channels.

Routing protocols for MANET's could be categorized into table driven or on demand methods. Table driven protocols require each node to maintain routing tables to store routing information and they involve constant routing table update mechanism. A node could send information immediately to a destination whenever it wants to do so. But these protocols suffer from substantial signaling traffic and power consumption problems. It also consumes local resources at the nodes such as processing power and memory to store the route entries. Table driven protocols include DSDV, WRP. The alternative to table driven protocols is on demand pro- tools which find a route to a destination whenever a node has information to send. Though signaling

and power consumption problems are minimized, they still suffer due to the fact that a node has to wait until the routing protocol finds a route in order to send data. One problem which is common to both these protocols is mobility which affects the performance of both these protocols. This is due to the fact that, mobility changes the connectivity graph (i.e. a link which was previously available may not be available at another point of time).

1.11.1 Path Duration and Their Significable In Mobile Ad Hoc Networks

As mentioned in the previous section, mobility changes the connectivity graph which in turn affects the performance. The metrics that are useful to predict this behavior are link duration and path duration. Link duration is the amount of time a node has an active link to its nearest neighbor (a node which is within the communication range of another node). If a node wants to send a packet that is too long to its neighbor, the neighbor should be in communication range until the communication is complete. If a premature disconnection occurs, the receiving node loses part of communication. In a multi hop scenario, the underlying routing protocol finds a route to a destination either by table driven or on demand. Both of these techniques finding a path which irrespective of how long the route would be alive. The period of time that a route is available is called route duration or path duration. Hence, the routes that become invalid after certain period of time would affect on going communications and increase the overhead of the routing protocol as well. Path duration is actually the minimum link duration along the path (the path to a destination comprises of individual links, each with specific duration. Since, the link/ path duration affecting the performance of routing protocols. It does affects the resultant throughput and overhead to the network as well. The speedy path enable us to communicate properly and to communicate with other nodes in less duration by which we could save time and thus become a reliable data communication.

1.12 MANATs Security

There are following Mobile Ad-hoc networks security needed due to rapid growth of intrusions or malicious attacks in network information systems-

- Routing security
- Data forwarding security
- Link layer security

- Key management
- Intrusion detection systems (IDSs)

1.13 MANATs Security challenges

- Vulnerable nodes
- Vulnerable channels
- No infrastructure (online Servers difficult to maintain)
- Dynamic topology
- Resources constraints
- Different requirement for different types of applications

1.14 Applications of IDS in MANETs

- Military communication as Coordination of a military object moving at high speeds.
- Bank and Govt. organizations to securing of account holders data.
- Emergency Service like Search, rescue, crowd control, and disaster recovery.
- Collaborative and Distributed Computing.
- Wireless Mesh Network and Wireless Sensor Network.
- Networks for ubiquitous computing.
- Telematics like automatic call forwarding.
- Wireless Personal Area Network.
- Home Network such as Home/office wireless networking (WLAN).

CHAPTER 2

REVEW OF LITERATUTE

The area of research is Intrusion detection systems in MANET. Security is a major concern for protected communication between mobile nodes in a hostile environment. In hostile environments adversaries can bunch active and passive attacks against intercept able routing in embed in routing message and data packets. In this paper, the authors focus on fundamental security attacks in Mobile ad-hoc networks. MANET has no clear line of defense, so, it is accessible to both legitimate network users and malicious attackers. In the presence of malicious nodes, one of the main challenges in MANET is to design the robust security solution that can protect MANET from various routing attacks.

Tarek Sheltami *et al* (2014), proposed IDS as Adaptive Three Acknowledges (A3ACKs) on mobile ad hoc network to increase security purpose and it is founded through the Watchdog mechanism. Before A3ACKs, many IDS are implemented on Watchdog and Pathrater mechanism and proposed it to observe misbehaving of malicious hop in MANETs. This paper is defined how three major problems significant techniques work for detection. These are receiver collisions, transmission power limitation and the collaborative attacks. DSR protocols detect misbehaving hop and also maintain the route failure. Here, evaluate the work on when two collaborative intruders nodes in a path. The IDS (A3ACKs) presences in where, there Watchdog technique not able to detect malicious node for e.g., collaborative collision, ambiguous collision, misbehaving report are false. A3ACK brings to improve more security on these problems. In here, this technique implements with Aack mode, Tack mode and switching system to perform on simulation and find packet delivery ratio between AACK and A3ACK matric in packet dropping attack on both basic as well as smart collaborative. It would aid of this technique with anomaly IDS mechanism will generate more effective packet delivery ratio and analyse transmission delay.

Félix Iglesias *et al* (2014), proposed anomaly detection network traffic based characteristic (feature) selection in multi stage networks. It defines how to detect and remove redundant, correlated, irrelevant data in a same path. This method used with data sets in traffic for filters of anomaly detected data and step wise regression of wrappers. The researcher evaluates this

technique where signature based data detection method fails to unknown attacks detection. Anomaly based technique can determine data pattern of normal traffic. It applies various parameters like Decision Tree classifier, Naïve Bayes, k-NN model etc. to performs the prediction improvement of traffic data, easy and cost effective process generates the IDS techniques. This technique gives the high percentage of anomaly detected malicious stores for features selection as compare on DARPA'98 and the KDD'99 data sets. The previous works are based on initial sets of same data in different features like information collect based or correlation step based. It would determine the data in wireless traffic to detect randomly mixed types in same features.

Zubair Md. Fadlullah *et al* (2013), proposed a survey to solve the radio network spectrum, have in networks as security threads. It regards with help of IDS to detect these threads opposed of CRNs (Cognitive Radio Networks). It detects malicious threads quickly against attacked through used of chain point detection algorithms. IDS proposed of anomaly based detection on CRN (Intelligent Networks). It mentioned, how the wireless communicate to IEEE 802.22 WRAN topology for detect intruders in a CRN networks. In multipoint approach where IDS do not work the user encrypted communication to intermediate neighbour through base station. In here, IDS calculates the PDR of the miss-use nodes (e.g. jamming attacks) when the nodes dropping or reflect the packets significantly. Chain point detection (non-parametric cusum) algorithm in anomaly detection to increases the PDR within the threads detection interval with low detection latency.

G.V. Nadiammai *et al* (2013), in this paper, author discusses a new approach for intrusion detection in data mining. In this modern world intrusion occurs in a fraction of seconds. IDS intellectually differentiate both intrusive and nonintrusive records. Most of the existing systems have security breaches that make them easily vulnerable and could not be solved. Data mining based IDS can efficiently identify these data of user interest and also predicts the results that can be utilized in the future. Data mining has been involved to analyze the useful information from large volumes of data that are noisy, fuzzy and dynamic. In this paper author used existing algorithms like EDADT algorithm, Hybrid IDS model, Semi-Supervised Approach and Varying HOPERAA Algorithm respectively. Our proposed algorithm has been tested using KDD Cup dataset. Generated the proposed algorithm shows better accuracy and reduced false alarm rate when compared with existing algorithms.

N. Wattanapongsakorn *et al* (2012) presented IDPS. It defines the problem in network through various attacks. To detects attack category and immediately take an action for prevent of network system known as real time detection. This paper elaborate algorithms as Machine learning it is new technique and implement on IDPS for finding accuracy in high level rate of detection. It considers Bayesian network, decision tree etc. with prior dataset to give high accuracy detection. For prevention it uses C 4.5 concept of decision tree approach for anomaly based intrusion detection that from Ethernet it detecting malicious packets (use packet sniffers) and send to further processing in data records. For more faster, reliable it would improve the algorithm to prevent for more secure network through high detection data rate.

S. Albert Rabara *et al* (2011), this research paper discussed about the technical challenges MANET poses as well as tells about the great opportunities in MANET. The key research issue is to promote the development and accelerate the commercial application of the MANET technology. The main features of IPv6 like security and end-to-end communication are highlighted that are to be integrated with MANET. The special needs of MANET bring very great opportunities with severe these challenges. With either insight, or empirical study on MANET is being conducted. There are many kind technical challenges in MANET that poses are also presented in this proposed. The paper points to some of the wide key research issues to promote and development in accelerate with various applications of MANET technology. A special work to known is paid on to integration of MANET with replies this significant feature of IPv6 in integrated security as well as end-to-end communication. This paper also elaborate and concern on research directions towards the interesting IPv6 based Mobile ad hoc network which is the most required for recent growing mobile population. The special kind of characters of Mobile ad hoc network brings the latest technology with wide opportunities and interesting challenges. Therefore in present MANET is growing more and more interesting research topic and there are only few research projects takes place at employed by academic and corporates in the world.

Christoforos Panos *et al* (2011), proposed the comprehensive analysis of IDS in anomaly detection. It introduced a new mechanism in detection with limitation. The evaluation is considers through advantage in metrics that define the characteristics, architectures and deployment of MANETs. It defines how the detection mechanism analysis in dynamic anomaly

environments. This technique detects a limited kind of malicious nodes within range. When the packets transferred in network it passage through intermediate nodes in optimized path. This mechanism improves the data packet ratio when destination node delay transmission rate after each interval. Dynamic anomaly detection analyzes the table after each interval. For more efficient work it might compute the complexity and deploy the behavioral architecture (such as character based, significant based) detection in MANETs.

Hong Huang *et al* (2011) introduced unique DoS attacks in wireless (ad hoc) network as DJM (Distributed Jammer Network) based on recent (NANO and MEMS) technology. For the more reliable performance he applied phase transition to performance in dedicate network and also scalar behavior for join state rule on number of nodes for DJN and DWN (Distributed wireless network) with the help of percolation theory. The scaling monitors of the performance of jamming node provide constraints of power efficiency. Previous works on this technique used in military means most of wireless network. As the future, it would be effective the challenge on data transfers, topology (random) control, routing mechanism, access control across the network

Mohsen Chegin *et al* (2009), in this paper, the wide research scholar presented an interesting offline algorithm who predicts the worst-case duration when wireless links has possible. Based-on prediction, It presented a proposed implies routing in this heuristic algorithm that it could system as computes a path with long duration widely and with feer of implementation and more than a given threshold of the problem. In primirly, it presenting the proposed prediction as well as routing techniques and easily applied to build of ad-hoc routing protocols. The proposed results showed that with the shortest routing path, for near about 90% of the well connection requests, paths gathered by an algorithm with minimum hop count and direct path without/with hop count improved, and the implies average path of these duration is improvement by near around 8%. This one is major problem because decentralize nodes don't has any aware in range of given session time.

Fangchao Yin *et al* (2009), proposed the research paper explained that the intrusion identified system. A growth of detection system strategy is applied in this system that detects the danger various kind of attacks been elaborated on the ad-hoc network. The increasing of the existing

packet data monitored and merely used the pattern-matching algorithm. The structure of network has rapid free motion, self-governed, communicating with multihopped also.

The establishment of such a computer network has flexible and free from in the area as constraints network infrastructure. Due to self-organizing nature of MANETs makes a prospect. However, it has lot of faced security issues. MANETs based on its own natured and the recent IDS technology, the paper proposed a wide structure of MANET network IDS systems.

This MANET structure implies with few nodes and observe one of them for near about 100 second and it wait for the veried of malicious attacks packets from source. MANET Network Based on its own decentralize and the present IDS technology, the paper proposed a basically structure of network as IDS (intrusion detection systems).

Luciano Bononi *et al* (2007), introduce a research on integrated and secured, typically it unique AOVD-based IDS approach in MANET. These IDS based AOVD route detection could observing the behavior or unknown anomalies of neighbor weathers it doesn't has a data packet information between nodes (like DSR). A designer to design the AOVD based MANET. It could take place known detection of node nature between nodes as well as creation. These are introduced the Watchdog mechanism has to designed and represent AOVD routing. Now here it proposed to kind of prevention against various kinds of attacks along with uses an IRM as well as IDM that monitored all activities of nodes. For analyzing verity of traffic activity within communication range it identifies the CIA. After that the protocol AOVD could changing verify of message like as RREQ and RREP. An IS-AOVD corrupted RREPs to find kind of malicious nodes, affected by creation of mobility, collision of the computer systems or networks.

PetarČisar *et al* (2006), proposed an IDS to statistical based anomaly detection that analyses the behaviour of network traffic and optimizing the best value of real traffic with key of false detection alarm. It used the standard deviation mechanism. A false positive alarm used to management of detection and determining it with thresholds to decrease it. These have suggested the methods by random process and calculate the alarm detection results. For the increasing of confidentiality monitored event checks repeated periodically. This technique applies in protocol detection, application and statistical detection in anomaly based IDS. In that false positive through detection of attacks reports to IDS and intrusion detection mechanism operates with

deviation pattern of both one at during the attacks and also with normal operation of network. For more better, it would work on behavioral knowledge of data on traffic and provide best decision to passing the message.

Theodoros Lappas *et al,* in this proposed, about the IDS in data mining concept. In Network Information Security, IDS is the act of identifying and detecting actions that take as the CIA (confidentiality, integrity or availability) of a source node. One of the major issues in the management of security of high-speed networks having large-scale. The detection of malicious packets within anomalies in patterns that kind of attacks or worm propagation. An IDS inspects all kind of inbound as well as outbound activity of network and identifies malicious patterns that may target a system attack from someone attempting to damage or break the system. IDS does not include only prevention of intrusions. This paper, proposed on mining of gathered data that are being applied the purposes of finding suspicious traffic packets.

Huy Anh Nguyen *et al,* in this introduced about mining of data that detection by IDS. In the variety of gathering of information in an internet world. Networks system and uses applications has more and more popular to uses of network. A various cyber-attacks and viruses and variety of security concept applied in the last decade, for example anomaly and IDS, security, cryptography, firewalls security. The NID would considered one of the most useful methods for defending and applying dynamic intrusion behaviors. IDS is becoming a critical kind of component to secure the network system. Due to wide area of security analyze and audit data as well as dynamic properties of network intrusion behaviors, introduced of IDS becoming an important that the problem is receiving attention from the research observation community. In this paper, authors describe of a collaborative kind of classifier algorithms and it uses the popular KDD99 dataset. Based on evaluation solutions, these popular algorithms for each kind of attack are chosen in the detection of suspicious pattern data internet work traffic.

CHAPTER 3
PRESENT WORK

3.1 Problem Formulation

A nature in dynamic topology, resource constraints, no centralized infrastructure and most of limited security in mobile ad hoc network, Each and every time has increasing the vulnerabilities to various attacks on nodes and channels. Network information systems needed robust securities due to rapid growth of intrusions or malicious attacks in an information system. Now in present a kind of anomaly security is a very important task of ad hoc networks. Each mobile device could move freely in any direction, and changes their links to other devices frequently. There are various kind of attacks involved in networks or computer systems as in black hole attack, the malicious node that having the shortest path to reach the destination and more falsely replies to the route as requests, and drops all gathering packets. The anomaly detection of IDS would detect more malicious nodes. In this research paper, it presents secure, fast, efficient and optimized data delivery from source node to destination node and the behavior of interconnected nodes. Here it would be a decentralized authentication, which would be found on the data routing tables and study that conducted to IDS (Anomaly based Intrusion Detection System) based on process, Significable, identification and make an optimized decision against intrusions. This proposed schema would help to boost the protection in the MANET and make the network more reliable.

Network information system could be looked challenges that detection of requires normal not known knowledge of intrusive behavior. Analyzes data first before the captured intrusion could be out of date and yet to define many times it is hard to detect and correct capturing of newer or unknown attacks. Anomaly kind of detection has newer and more suspicious malicious find cons of raising alerts concern of the outcome traffic. The sophisticated knowledge about newer attacks is very dependent on the computer system, operating system, network systems and application hence tied to specific environments. Multiple malicious nodes in ad-hoc networks cooperate to perform attacks.

The security mechanisms used in these networks are key management protocols, secure data aggregation and the trust management. Black hole attack is the dropping of the packets and it

depletes the battery power in the network. The attack is carried out by either the compromised nodes or malicious nodes, which are present in the network. The clusters of the sensor network communicate with each other through a decimate node and if the decimate node is a malicious node then there is no data exchange between the clusters as it would drop the packet and it would degrade the performance of the network.

3.2 Objectives

An Intrusion Detection Systems (IDS) as Anomaly Based is quite to analyses the data packet to find malicious node who dropping the packets or modify it. The Objective of the study is using the new technique for Anomaly-Based IDS and it would give more secured, fast, efficient and optimized data delivery from source node to destination node. In this research propose, there are following objectives would be achieve:

- Making a random topology where the numbers of mobile nodes would be present
- Passage of data from the various nodes
- Then the identification malicious node place decentralizes authentication
- Finding a secure path for route based on IDS instructions
- Design and Implementation of the proposed routing algorithm for security
- To enhance the reliability of MANET network
- An isolate the malicious nodes from the network.

3.3 Research Methodology

To enhance the IDS security in MANET, we are going to make a novel schema. This IDS system i.e. Anomaly-Based Intrusion Detections would be more secure as compare to the previous one. Here we would place decentralize (centroid) authentication schema which would provide the authentication to each node on the basis of secure algorithms. The working of the algorithm is as follows:

I. Proposed the Algorithm to Deploy Nodes:

- Random deployment of N number of nodes within area.
- Choose n number of nodes as seed node.

II. Proposed the IDS node detection Algorithm:

- Enter new node into network.
- New node would send centroids to IDS node.

- Based on centroids IDS node would provide a token to every node that token is required for communication.
- Now the centroids contain Dynamic Routing Information (DRI) table, it's having value of THROUGH and FROM.
- So IDS node would verify that if the value of THROUGH is 'yes' in DRI table then it's a normal node and IDS node would provide token to it.
- Now the new node would join the network would be authenticate from decentralize (centroid) node on the basis of some parameters.
- Now source node would choose.
- Now source node would want to communicate with the destination node.
- It would choose a path till destination by using AODV protocol.
- It would select the optimized path and tell to authentication node.
- Source node would send path (route) to IDS node for cross verification.
- IDS node would send rough data with sequence number 0 to 10.
- If the node is malicious then it would drop packets, else Node would be normal and it would forward packets.
- Now IDS node would verify all nodes and warn to source node about the path.
- For the whole process we would train IDS node through adaptive learning that how to check the behaviour of nodes.
- It would again check new nodes and find out is it isolate.
-

III. Parameters within Anomaly IDS to detect misbehaving of nodes:

- No. of times that access the network for sharing of information (like transfers of packets).
- Network can access the given session as limited transmission time.
- No. of times node discarded by network.
- Identify a sequence of packet that waiting for transferring.
- Check every Delayed to receiving of packets in an ad hoc environment.
- Validation and Performance determine by each and every transferring of packets.
- No. of packets dropping by the hop including intentional attack.
- Ratio of no. of received and sent packets by the node.
- Check overload of multi-sending of packets through IDS Node.

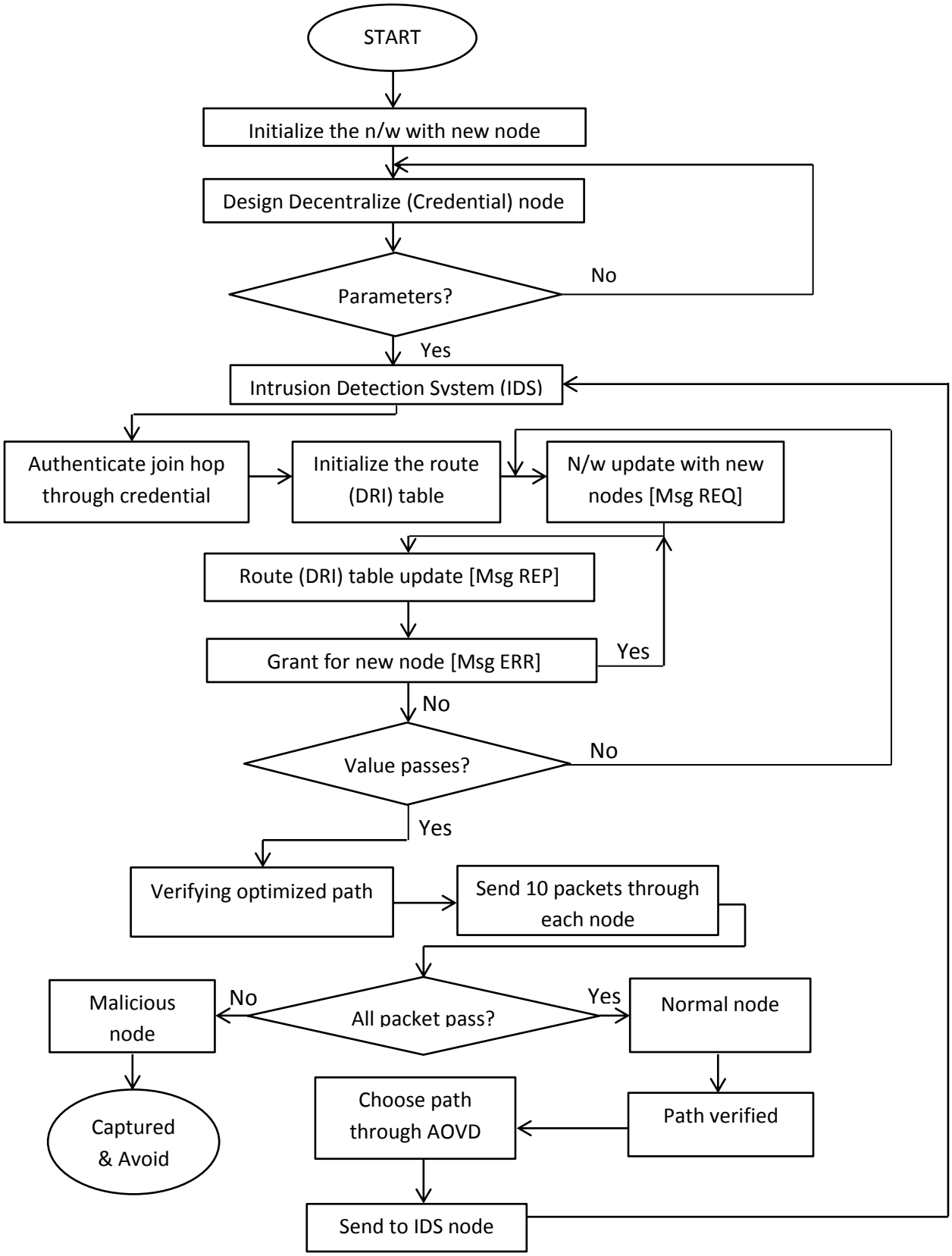


Fig3.1: An novel IDS malicious node detection process

Another algorithms to make in a Step 2 i.e., decentralize (centroid) host in above algorithm after initialization of nodes in network.

IV. Proposed algorithm to decentralize (centroid) IDS node:

- Choose minimum 5 nodes as seed node.
- Joint all 5 seed to each other.
- Now, check maximum distance covers by each of the seed node.
- Find conflict connection of every routing node.
- Now would check parameter of this conflict node.
- Check significant of conflict node.
- Now would choose best one node in a MANET.
- Deploy IDS node at that pointed node.

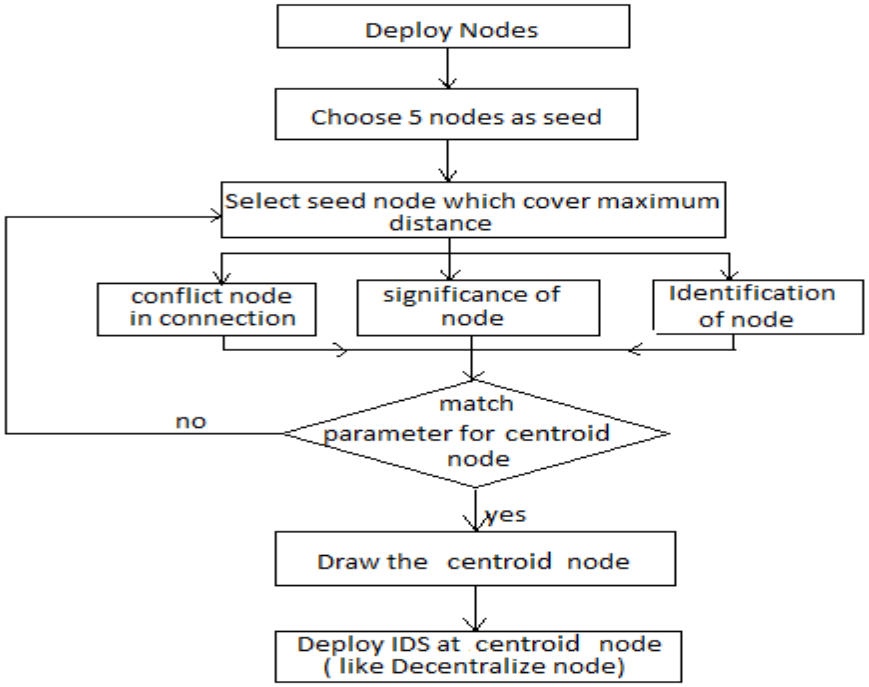


Fig3.2: IDS decentralize node implement process

V. Parameter to choose decentralize IDS node:

- Random deployment of N number of nodes within area.
- Choose n number of nodes as seed node.
- Identifying the source (IDS centralize) node.
- Conflict of source node.
- Establish the oriented connection.
- Transferring of packets in form of fames.
- Terminates the connected path.

VI. Process to verifying the path:

- Optimize by IDS node.
- Check source (New) node.
- Check destination node.
- Check parameters for source node.
- Established the route with AODV protocol.
- Identification of packets by IDS node and send to destination through it.

After the authentication to whole nodes through the decentralize (centroid) also detect the intrusion if anyone wants to access in an unauthorized way through IDS to detect at anomaly based for detecting the current malicious behavior nodes.

3.4 Tool Used

To implement the proposed technique in a simulated environment, the tool used is MATLAB. It is a high-level programming language developed by MathWorks. MALAB is the acronym of Matrix Laboratory. It performs the analysis of data, matrix manipulations, algorithm implementation and plotting of functions with the use of built-in math functions. MATLAB enables the developers and researchers to reach the solutions in a faster way than with the programming languages like C, C++, Java, etc. MATLAB also provides the interface with many programming languages to implement the methods. MATLAB also provides the support to Simulink which provides the graphical simulation. MATLAB could be extended to a number of add-on products such as mathematics, parallel computing, statistics, optimization, control system design and image processing. MATLAB has a number of applications in various fields and it is generally used in research and academic institutions as well as industrial enterprises.

CHAPTER 4

RESULTS AND DISCUSSION

The results are derived in comparisons from previous solution i.e. proposition of node detection, fast and reliable packet transferred, identifying of suspicious newer or unknown nodes, isolated congestion, delay over on network, improving the performance and throughput. The whole process is done on Matlab simulation and MathWorks for finding the robust solutions s compare to previous proposal.

4.1 formulation of DRI Table:

IDS node would check credentials of coming new unknown node and then value of THROUGH and FROM to consider behavior of these interred node that are dynamically identified by DRI tables.

Consider the networks, F = FROM, T = THROUGH and

If F = 1 and T = 1 then Node = Normal

If F = 1 and T = 0 then Node = Malicious

If F = 0 and T = 1 then Node = Normal

If F = 0 and T = 0 then Node = Malicious

Here, Start deploying nodes by clicking on deploy node button. All the nodes are deployed into the network all nodes are wireless. IDS as also deployed. A new node is added into network which would go to authenticate.

Now all performance contain interface which is having number of buttons with different control. New node would send his credentials to IDS node. These credentials contain the value of THROUGH and FROM . IDS node would check credentials and if the value of THROUGH is 0 then it would consider it as malicious node. Here the value of THROUGH is 0 so it would alert as a malicious node.

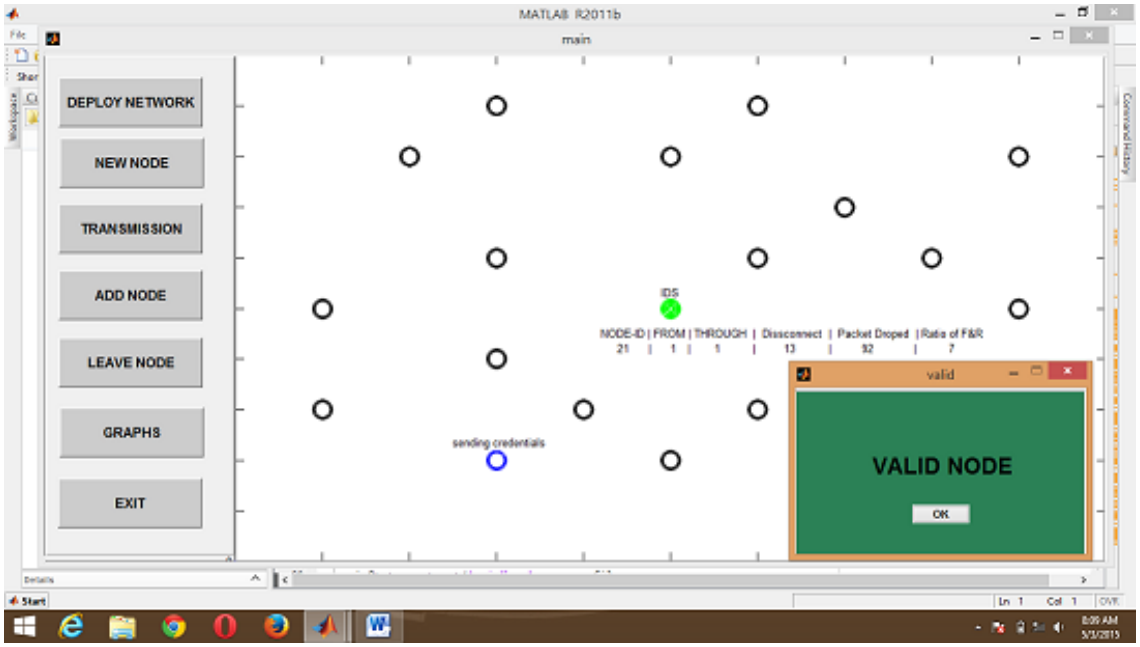


Fig 4.1: Credential check for valid node

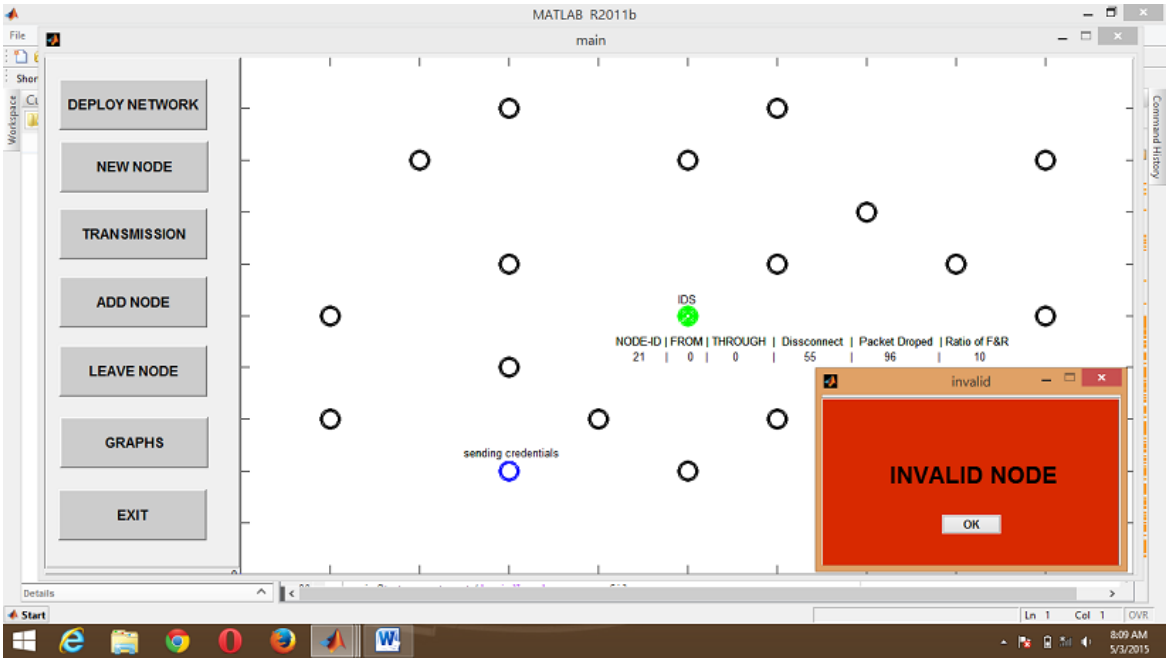


Fig 4.2: Credential check for invalid node

Now a new node would again send credentials .Now the value of through is 1 so it declare it as a valid node. Source and destination nodes would be chosen. Showing random possible paths between source and destination.

4.2 Disconnect of malicious interred:

The networks would analyzes of insider/intruder, where-

Consider, T = Threshold value of disconnection

M = Max. number of connection

Let's, M = 100, T = 30 and

R = Random value of disconnection

If R > T then Connection = Normal

If R < T then Connection = Malicious

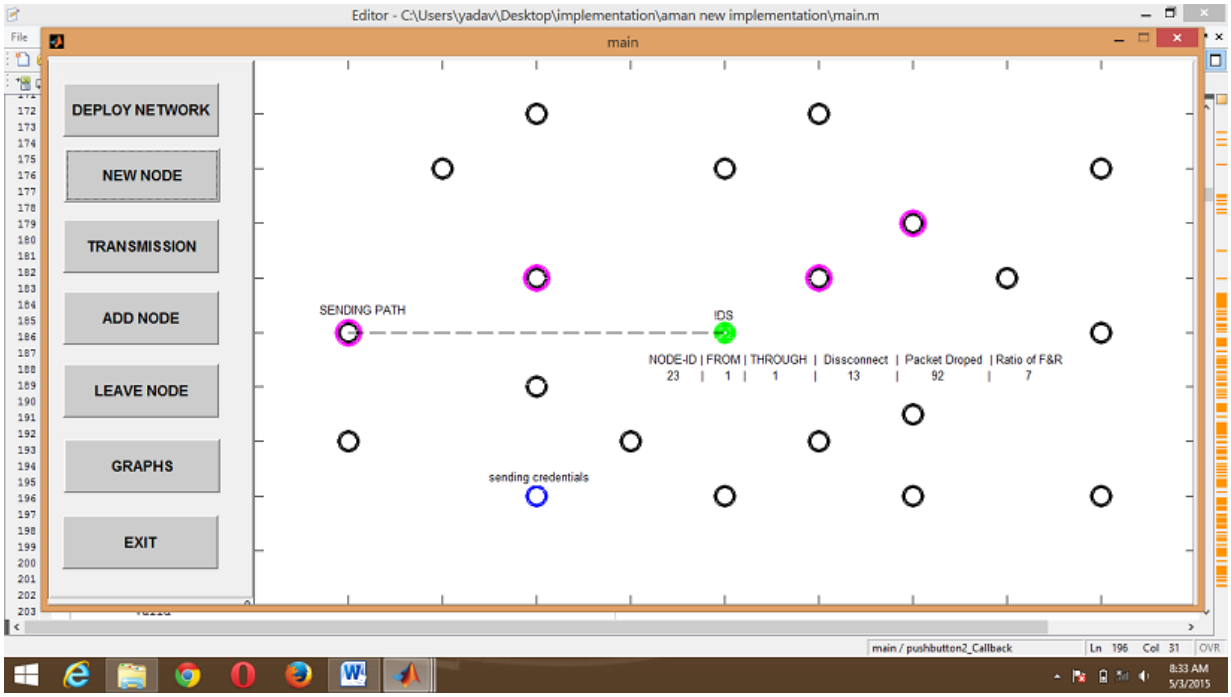


Fig 4.3: Source node identification for intrusion

Now, Showing random possible paths between source and destination. The final path would be selected and source node send this path to IDS for verification. IDS would send some rough data through it and check the DRI values.

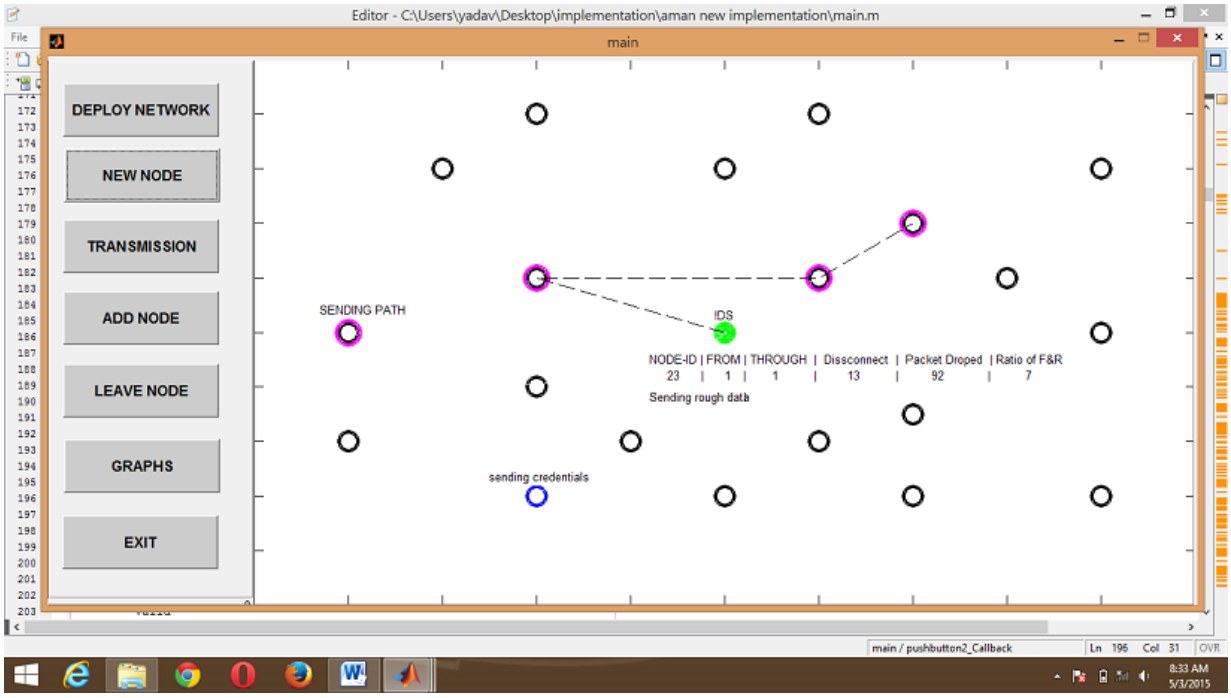


Fig 4.4: Protocol identifying the optimized path

4.3 Network that drop of malicious packet:

Each suspicious packets would dropped by network, where-

Consider, P = Max. number of packets

T = Threshold value of packet drop by node

Let's, T = 40, P = 100 and

N = Random value chooses by network

Therefore,

If T > N then packet = malicious

If T < N then packet = Normal

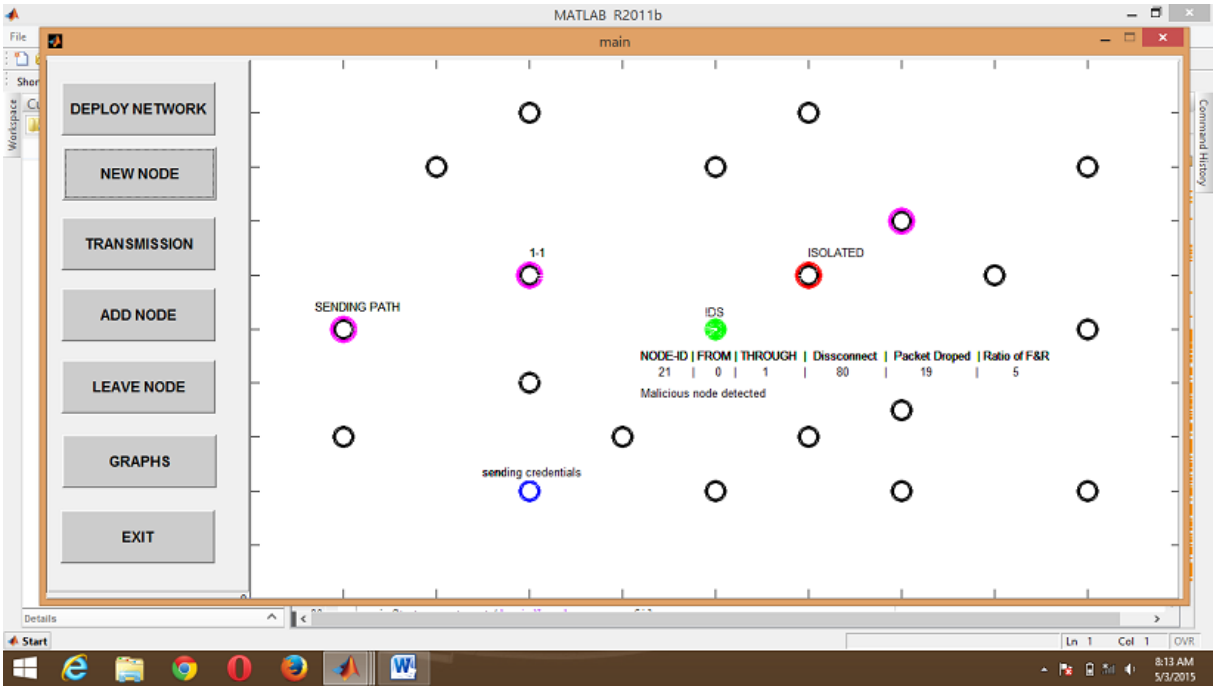


Fig 4.5: IDS to identify the isolated node

4.4 Ratio of forward and Receive resultants:

A network, receiving and forwarding of number of packet by each node is identified by IDS node. Where –

Consider, X = number of packet receive

Y = number of packet forward

Let's, X = 40, Y = 34 and,

Z = Difference between X and Y, S = Threshold of max. number of packet drop. Therefore,

If S < Z then RFR = Normal

If S > Z then RFR = Malicious

If again the value of THROUGH is 0 then it declare node as malicious. Now it would choose another path for communication.

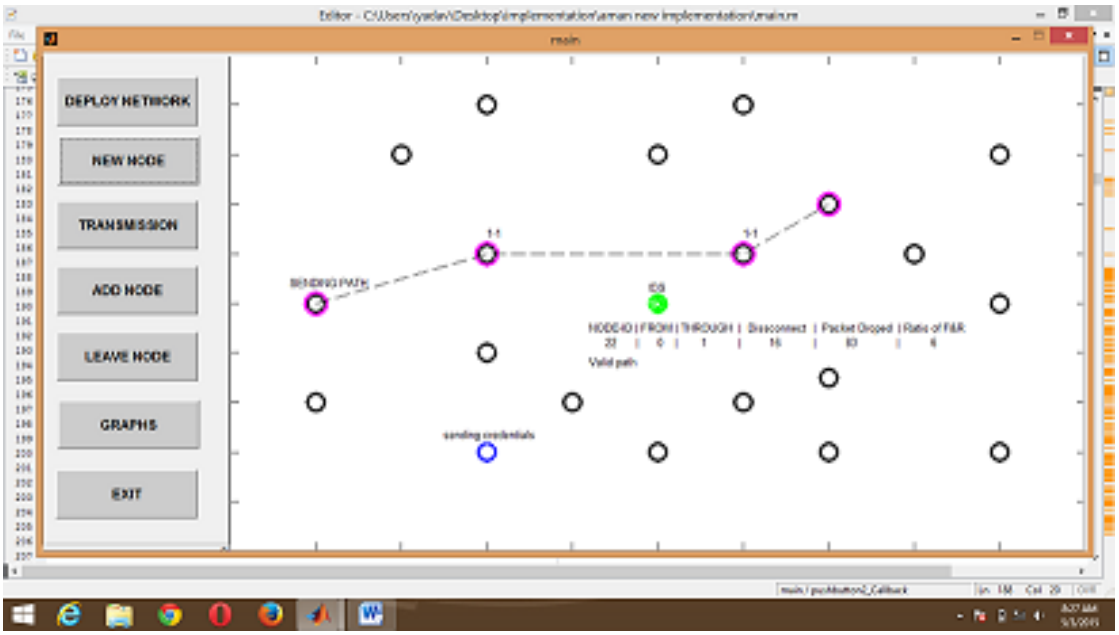


Fig 4.6: packets communicating from source to destination

4.5 Throughput of resultant values:

A resultant of throughput generates by comparisons of network overhead versus misbehavior ratio of coming node into the network.

Consider, T = Threshold value of overhead and S = Misbehavior ratio of generated by networks. Therefore,

If T > S then Throughput = Normal

If T < S then Throughput = Malicious

Here also have an option in decentralize environment as new node is added in to network as well as existing node is leaving network. After establish the valid route through AODV protocol. Sends 10 packets from source to destination node and all packets passed through the valid path and destination host received these all 10 packets then it send the acknowledgement to source node.

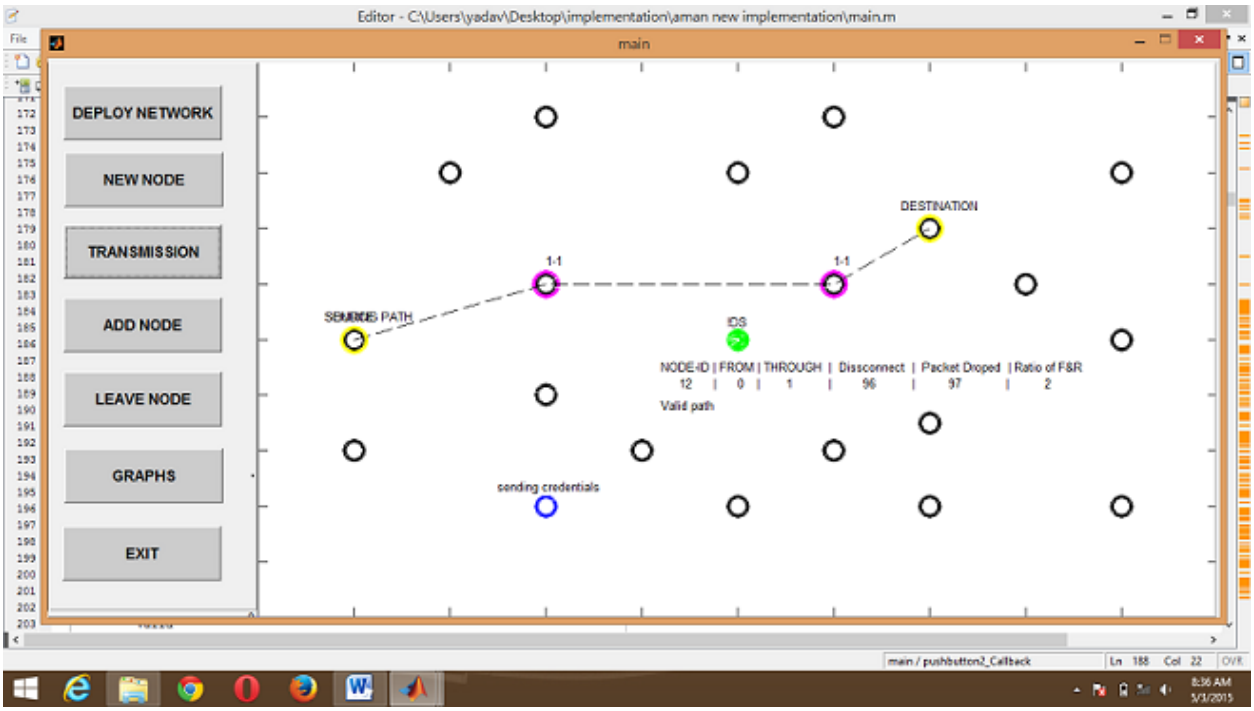


Fig 4.7: Sender gets Acknowledgement

4.6 Overload Graph: Curve show the overhead between no. of forwarding pkt. and receiving pkt.

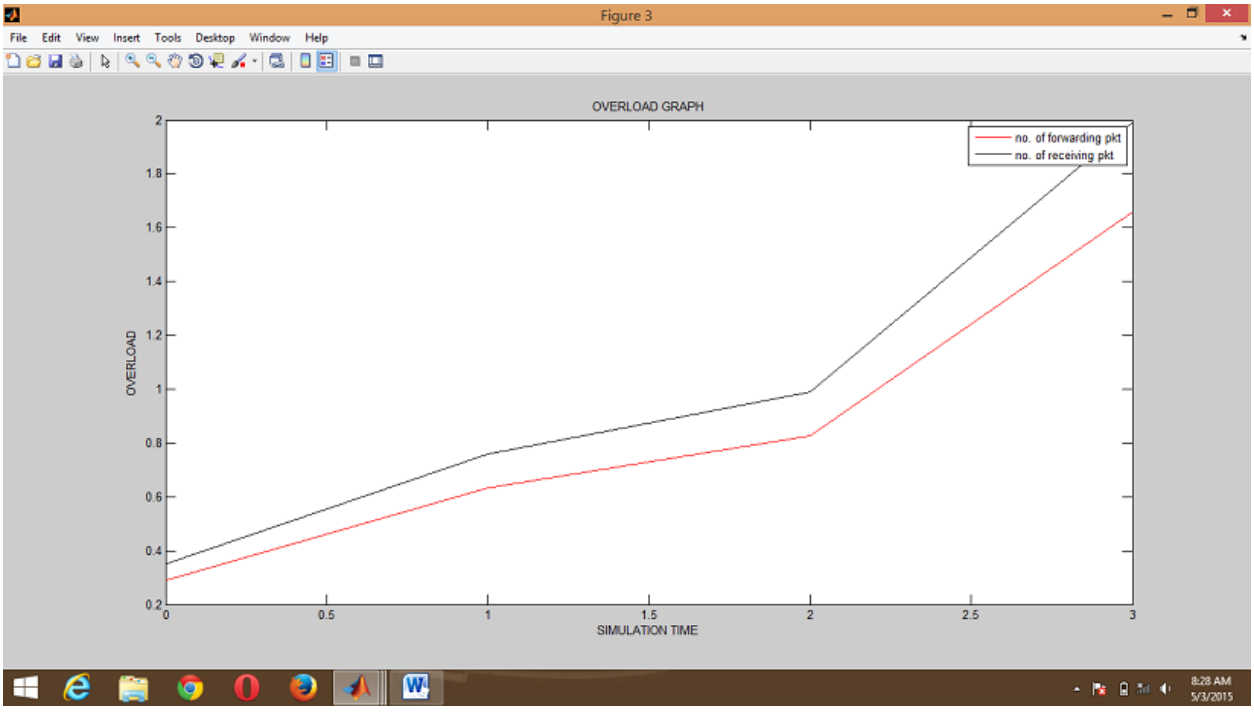


Fig 4.8: overhead curve between no. of forwarding pkt. and receiving pkt.

4.7 Delay graph:

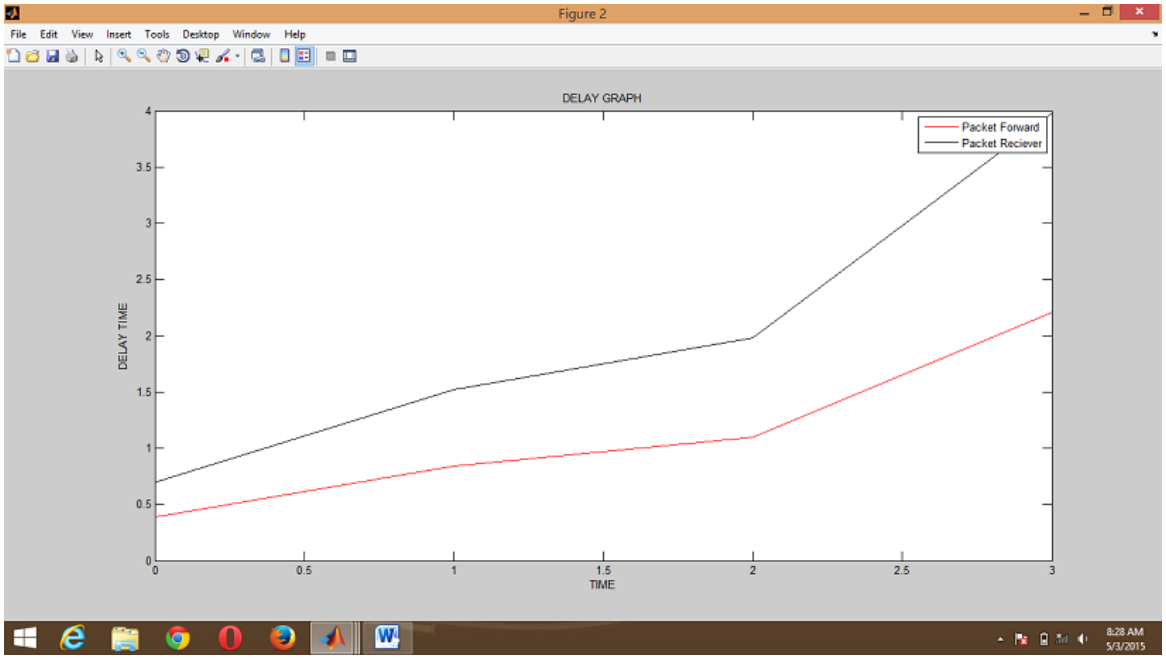


Fig 4.9: Delay graph

The curve shows the delay in the communication. Because of the IDS it takes little bit extra time to choose safe path.

4.8 Throughput graph:

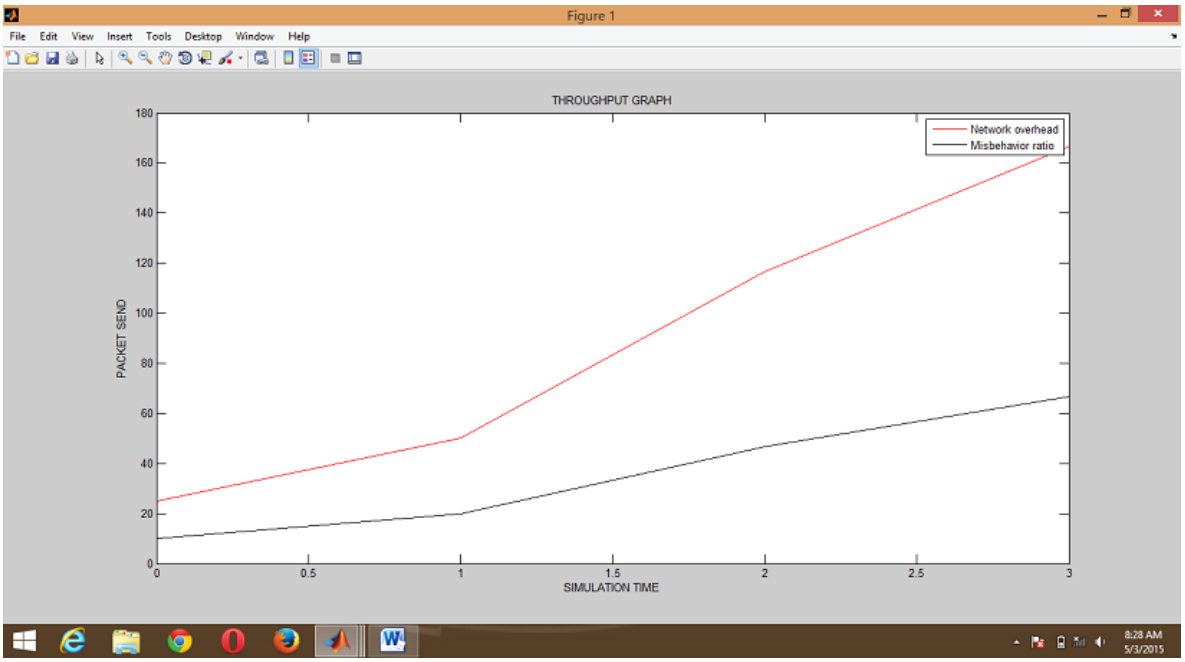


Fig 4.10: Throughput graph

Now because of safe path there is no packet loss. So the resultant of throughput is much high than normal.

4.9 DRI (Data Routing Information) Table:

Node ID	FROM	THROUGH	Disconnected	Packet Drop	Ratio of F&R
21	0	1	80	19	5
22	0	1	16	83	6
23	1	1	13	92	7
24	0	1	72	102	13
25	1	1	19	55	9
26	0	1	22	12	4
27	1	1	41	56	12

Table 4.1: DRI (Data Routing Information) Table

CHAPTER 5

CONCLUSION AND FUTURE SCOPE

Conclusion:

The challenges of ad hoc network maintaining and in correct ways that becomes harder as increase in the number of mobile nodes with latest networking needed whose information much consistent, and such the rate of change in the self-organized topology increases. The milestone in creating the more reliable routing protocol for mobile ad hoc networks has to build IDS that could adapt a wide variety of needed conditions that could be with recent high security in any mobile ad hoc network at over time. Because of self-configure nature of MANET lots of active and passive attacks are possible so to prevent them we are going to design advance IDS which would give the warning to node before communicating to others. On the other hand Intrusion Detection Systems are now days are used as an efficient tool which is used to detect the attacks. The attacker node provides the false routing table information during the formation of paths between the nodes in the network. If there's a black hole node present within a network, then the overall performance of the network would be less. In the proposed method, if the network performance becomes less than the threshold performance, then the nodes would monitor the fake reply packets and identify the black hole node and removes it from the network. In general it is quite difficult to analyze from large amount of data to find malicious data. Here we would place a centralize authentication schema which would provide the authentication to each node on the basis of DRI tables of each node. So, IDS would work on the basis of DRI and modified Anomaly based IDPS algorithm. This process would provide more security and make MANET more reliable. Our future work would use the more priority to design the association of authentication and robust anomaly based IDPS in Diffie helman or AES techniques and QoS routing protocol in order to get higher scalability.

CHAPTER 6

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CHAPTER 7

APPENDIX

Questionnaire:

What is alert?

An alert is term that notification of an important event.

What is collision?

This is the Condition in which two packets are being transmitting over a medium at the same time. Their interference makes both unintelligible.

What is Error rate?

This is the ratio of number of the data units in error to the total no. of the data units.

What is intermediate system?

A device attached to two or more subnets in an internet and that perform routing and relaying of data between end systems. E.g.– Bridge, Router etc.

What is packet?

A group of bit has include data plus control information. Generally refers to a network layer (OSI layer 3) protocol data unit.

What is Quality of Services (QoS)?

It refers to the properties of a network that contribute to the degree of satisfaction that users perceive, relative to the networks performance.

What is Sequence number?

A number contained in the header of a PDU (Protocol Data Unit) that, either alone or with other header field, serves to uniquely identify this PDU out of sequence a PDUs.

What is Blacklist?

A list of discrete entities, such as hosts or application being have been previously determined to be associated with malicious activity.

What is Whitelist?

A list of discrete entities, such as hosts or applications and that are known to be benign.

What is malware?

It is a program that is meant for malicious (mal means malicious and ware means tool) properties. E.g.- Virus, worms, Trojan attacks, Ransomwares etc.

What is Macro Viruses?

These are among the most common viruses, and they tend to do the least damage. Macro viruses in fect your Microsoft Word application and typically insert unwanted words or phrases.

What is seed node?

It is a QoS in the Ad-hoc networks to provide the real-time. The IDS node has to manage the neighbor nodes and the geographic forwarding to determine the routes. The IDS node and the location information are collected by the beacon exchange mechanism and the estimation of delay at the node is calculated by the elapsed time.

What is Spanning port?

Switch ports that can see all the network traffic go through the switch.

What is tuning?

Altering the configuration that of an intrusion detection and prevention system to improve its detection accuracy.

Abbreviations:

AP	Access point
AODV	Ad-hoc On Demand Vector Protocol
CVE	Common Vulnerabilities and Exposures

CSRF	Cross- Site Request Forgery
DMZ	Demilitarized Zone
DRI	Data Routing Information
RFR	Ratio of Forward and Receive
GRUB	Grand Unified Boot Loader
IRC	Internet Relay Chat
IDS	Intrusion Detection System
IDPS	Intrusion Detection and prevention System
IMAP	Internet Message Access protocol
LILO	Linux Loader
MIS	Management Information System
MALWARE	Malicious Ware (Tool)
NOS	Network Operating System
NFAT	Network Forensic Analysis Tools
RAT	Remote Administration Tools
SMB	Server Manage Block
UIA	Unique Identity Register
VIRUS	Vital Information Resource Under Seize
VPN	Virtual Private Network
XSS	Cross-site scripting
WPA	Wi-Fi Protected Access
WPE	Wired Equivalent Privacy
WVE	Wireless Vulnerabilities and Exploits