

Survey of Fault Based Algorithm in Manet

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Abstract- . Mobile ad hoc networking allows portable mobile devices to establish communication path without having any centralized infrastructure. As there is no centralized infrastructure and the mobile devices are moving randomly, this gives rise to various kinds of problems such as routing and detecting faulty mobile nodes in the network. The nodes may fail because of battery discharge, crash or limitation in age. Fault diagnosis in Mobile Ad-hoc Networks (MANETs) is very challenging task. In fact, fault-diagnosis becomes an important building block to establish dependability in MANET.

Keywords

Manet ,Faluts ,Clustring ,ADSD

1. INTRODUCTION

It is a self configured wireless adhoc network of mobile nodes.Each node has a router or a switch connected by the wireless connection. MANET organization depends upon the location of nodes ,theirconnectivity ,their service discovery capability and their ability to search and route messages using the nearest node or the nearby nodes. MANET are the form of wireless network which donot require the base station for providing netoworkconnectivity .MANET sometime called a mobile mesh network i.e a self configuring network of mobile devices connected by the wireless links. IT represents the complex distributed systems that comprise wireless mobile nodes that can freely and dynamically self organized into arbitrary and temporary adhoctopologies,allowing people and devices to seamlessly internetwork in area with no pre-existing communication infrastructure eg:-Disaster recovery environments.

The adhoc network are a new wireless networking paradigm for mobile hosts.Unlike traditional mobile wireless networks,adhoc network donot relay on fixed infrastructure.Instead host relay on each other to keep the network connected.There are two kinds of mobile network.

1)infra-structured network

2)infra-structureless network

1) infra-structured network:-

A network with fixed and wired gateways. The bridges of the network are known as base station .A mobile unit with in the n/w connect to and communicate with the nearest base station(i.e within the communication radius).Application of this n/w includea office WLAN.

2)infra-structureless network:-

It is commonly known as Ad hoc network.They have no fixed routers. All nodes are capable of moving and connected in an arbitrary manner. These nodes function as routers which discover and maintain routes to other nodes in a network.

Non infrastructure based MANET are expected to become an important part of the 4G architecture .Adhoc networks can be used in areas where there is little or no communication infrastructure or the existing infrastructure is expensive or inconvenient to use.

Adhoc network is a collection of mobile nodes which form a temporary network without the aid the aid of centralized administration or standard support service available on conventional network.The nodes are free to move randomly and organize themselves arbitrarily. Thus the n/w's wireless topology may change rapidly and unpredictably.

Routing in MANET is quite challenging task because of some factors like no fixed network infrastructure ,dynamic network confriguration ,nodemobility,low battery power and frequent node failure etc .For this purpose various routing protocols have been proposed for MANET with varying performance in different condition.

Mobile ad hoc networking technology can provide extremelyflexible method for establishing communications for operations in many scenarios that require low cost and/or rapidly deployable communications with survivable efficient dynamic networking. A mobile, ad-hoc network (MANET) is an autonomous system of wireless mobile hosts that

communicate with each other in the absence of a fixed infrastructure. Designing efficient routing algorithms/protocols for MANETs is a very challenging problem, due to certain characteristics that are present in mobile networks. In such environments hosts are free to move arbitrarily; thus the network topology, which is typically multihop, may change randomly and rapidly at unpredictable times.

The remainder of the paper is organized as follows. Section 2 describes Faults done so far in this field. Section 3 describes Clustering Based Routing Protocol. Finally the paper concludes with a summary.

II. Faults

Wireless Communication System is playing a big important role in information systems and its management is very important and vital. There are many managements such as configuration management, fault management, performance management, security management, accounting management and etc. Fault management is more important.

A node becomes faulty because of battery discharge, crash and limitation in age. The presence of faulty node affects the efficiency and throughput of the network, which makes the network inconsistent. Faulty nodes cannot communicate with the other mobiles or behave unexpectedly and send unexpected results. Thus it unnecessarily consumes energy and causes inconsistency.

Types of Faults

Each node in the system can be in one of two states faulty or fault-free. In order to exchange information, a node requires multiple hops in the MANETs due to restricted transmission power in the network. Due to issues like unpredictability of environment, unreliability of wireless medium, resource constrained nodes and dynamic topology, MANETs are prone to various types of faults.

Based on the Duration- Based on duration faults can be of three types:

- **Transient fault:** A transient fault can disappear without any visible event; it appears in a network for short time. The recovery of transient faults from system is addressed using repeated-round techniques. A probabilistic model used for the action of faulty periods, and a fault analysis is used to obtain the optimum retry period.
- **Intermittent fault:** It is problematic type of transient fault; can't predict its appearance and disappearance in the network. An intermittent fault is occurred by a number of factors. These factors can only be identified when

malfunction is occurred. Intermittent faults are hard to identify and repair.

- **Permanent fault:** Once it appears in network it remains until it removed and repaired by some external administrator. Permanent faults are simpler to deal.

Based on the Behavior-Based on behavior faults can be of two types:

- **Soft Fault:** Soft faulted units can communicate with its neighbors but with unexpected behaviors and always give unwanted response.
- **Hard fault:** Hard faulted units cannot communicate with its neighbors. It neither sends nor receives any information from the network.

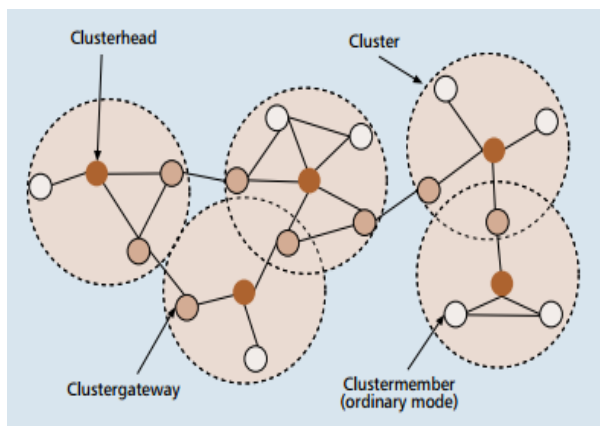
Based on the Occurrence-Based on occurrence faults can be of two types:

- **Static fault:** All faulty nodes be faulty from the starting of diagnosis session. The fault-free node can't be faulty during diagnosis session.
- **Dynamic fault:** Fault-free node may become faulty during diagnosis session. It is hard to diagnosis because any node may fail after it diagnosed fault-free by any fault-free node

III. Clustering

*“Connecting two or more nodes together in such a way that they behave like a single node.”*As we know that Mobile ad hoc networks (MANETs) are gaining popularity in recent years due to their flexibility, the proliferation of smart computing devices, and developments in wireless communications. Due to the mobile nature of the network, creating reliable clusters. Clustering is an important research topic for mobile ad hoc networks (MANETs) because clustering makes it possible to guarantee basic levels of system performance, such as throughput and delay, in the presence of both mobility and a large number of mobile terminals. A large variety of approaches for ad hoc clustering have been presented, whereby different approaches typically focus on different performance metrics.

In a clustering scheme the mobile nodes in the MANET are divided into virtual groups and they are geographically adjacent into the same cluster according to some rules with different behaviours for nodes included in a cluster from those excluded from the cluster.



■ Figure 1. Cluster structure illustration.

It can be seen that nodes are divided into number of virtual groups based on some basic rules. Under a cluster structure Mobile node may be assigned different status or function such as clusterhead, clustergateway or clustermember.

IV. Fault Based Exciting Algorithm

In 1998, Hi-ADSD was implemented, integrated to an SNMP based network management system on a 37-node Ethernet LAN. As SNMP applications are currently widely deployed, but fault management is still based on rudimentary procedures, this implementation by itself is also a significant contribution to the field of network management.

Other important issues include synchronization mechanisms to guarantee a $\log N$ diagnostic latency, fault-tolerant mechanisms for event-driven dissemination of events and for timestamps, that would guarantee the minimal amount of diagnostic information exchange.

In 2008 the Clustering concept is used. The failure detection algorithm coupled with suitable clustering algorithm make a very efficient failure detection service for wireless ad-hoc networks. Clustering divides whole network into two level communication architecture namely intra-cluster and inter-cluster. Two types of message overheads are required to maintain such as intra-cluster and inter-cluster. The disadvantage of the clustering approach is that CH itself may fail, hence it becomes necessary that the presence of leader is also need to be monitored and in case of its failure another node takes over the CH. Author use the concept of deputy cluster head or backup cluster head to solve this problem.

In 2001 author propose a new algorithm for routing in mobile ad hoc networks, the Position guided Sliding-window Routing (PSR) protocol. This protocol provides a single-tier routing organization scheme by employing a simplified way of localizing routing overhead. In this paper they enhance this approach by adding an additional level of hierarchy (on the cluster level which

is of much smaller scale) in order to improve the operational effectiveness of this scheme and alleviate some of the drawbacks associated with the position-based protocols (such as routing deadlock occurrences). To overcome the drawback Deadlock and loop that is inherent to the position based routing schemes, gateways are used as intermediate hops along the path to the destination. When a packet arrives to a gateway, some calculations is performed at the gateway to see if there exists a path between the local node to another gateway of local cluster that is closer to the destination. If deadlock/loop is found during this operation, it is better to request the gateway of the previous cluster to change the path to another cluster. The grid-clustered PSR is used to avoid deadlock/loop creation.

In 2007 a new adaptive fault identification protocol, called Adaptive-DSDP, for fixed topology MANETs. The diagnosis is based on the comparison approach and accomplishes a correct and complete fault identification. Adaptive-DSDP uses a spanning tree in order to disseminate the local diagnosis views gathered separately by the mobiles. The spanning tree is initially configured with the MANET, and then adapted to any faulty situation that might affect any of its internal nodes. Dynamic fault identification solutions that will be able to tolerate the occurrence of faults during the diagnosis session. Author also investigating a self-diagnosis approach that would be more appropriate for sensor networks. Last but not least, their aim the development of new adaptive failure detector that can be used by MANETs' applications or routing protocols in order collect information on the fault status of the MANETs.

CONCLUSIONS

In the near future, MANET applications will be in demand. The need for failure detection architecture is crucial, especially for real-time applications.. fault diagnosis in networks has made great progress in common fault detecting and localization. Each method of fault diagnosis in networks relies on one or more theories, which determinates the application of method.

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