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### **RESEARCH ARTICLE**

# A Study on Issues Associated with Mobile Network

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*Abstract: A Mobile Network is most dynamic and public network that is available to all users. As the network is distributed in large network area with number of associated communication technologies as well as protocols, the communication becomes a challenge in this network. Along with the architectural and the communication challenges, other challenges included here is the attack performed by internal and external nodes. These attacks are either performed to destroy the information or to reveal the communication information from the network. The aim of this paper to explore these challenges those are present in mobile network. The work is about to aware about these challenges to a researchers so that the algorithmic approach or the optimization will be performed under the light of these challenges.*

*Keywords – Mobile Network, Challenges, Attack, Fault, Hop-Count*

## 1. INTRODUCTION

A mobile network is a dense network distributed in large as well as limited geographical area with the specification of different associated parameters, communication scenarios as well as the communication framework. The network is defined with number of specification that is set statically as well as dynamically. These specifications are either architecture level or the algorithm level or application level. As the network can be static or mobile, based on it the algorithmic approach and communication approaches are applied over the network. These approaches are specified along with the generation of communication responsibilities, location based route specification, node monitoring and network monitoring, Mobility analysis etc. The specification of the constraints is also defined under the route specification and the parameter specification for the network. These all parameters includes the constraints level analysis as well as boundaries based analysis is here performed based on the type of nodes. Differ parameters that affects the network communication are shown in figure 1.

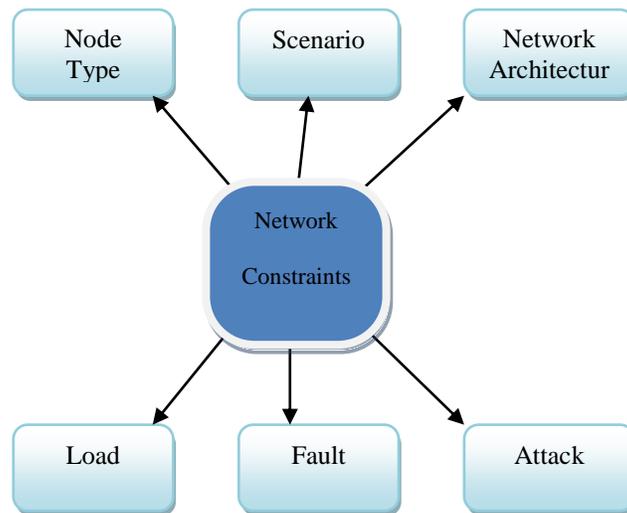


Figure 1 : Network Constraints

The first parameter associated with mobile network is the network type of network architecture. The network architecture can be planner network or the mobile network or the hierarchical network. Based on this network architecture, generally the other requirements and specifications are decided such as protocol selection, routing algorithm. The architecture also includes the specification of the geographical area covered by the algorithm. The centralized or the collaborative communication type also depends on the network architecture. Based on this architecture, the protocol level decisions are also taken.

Once the architecture is decided, the next work is to decide the network scenario. The scenario is generally application based. The network scenario can be a centralized class room scenario or it can be scatter rescue system scenario. The scenario also specifies the node role in the network. It can be a static node, dynamic node, controller node or the intermediate node. Another specification required here regarding the network is node type. The node type is here defined under the parameter specification. These parameters include the energy type, processing power, memory strength etc. The node type also includes the static or dynamic nature of node. Based on these three parameters the architecture or the framework level decisions are taken and the network is defined. Once the network is specified, the network is to perform the network communication.

During this communication stage, the communication level parameters are analyzed or identified. These parameters are responsible to attain the effective throughput from the network. These parameters includes the load based analysis, fault based analysis and the attack level analysis. The load is the foremost analysis requirement because of which the strength and the load of the network is analyzed. While performing the dynamic communication such as routing over the network, the activity monitoring is performed over the network nodes. This monitoring is done either by the controller node or by some distributed specialized nodes. Load is one such analysis parameter. A heavy load node is not reliable for the communication. According to the communication type or the routing algorithm, the load over these nodes can either be increased or distributed. A low congested network is always more effective and reliable to provide the effective communication. Another parameter considered here for the communication is the fault based analysis. The fault monitoring is required to improve the network communication and to generate the effective routing over the network. These faults include the broken link or the bad links. As the communication is performed over these bad links, the data loss can occur. To avoid this, the detection and prevention based approaches are required. Another issue in mobile network is the attack performed by the intruders. The intruders can be the internal or external network users that want to reveal or extract the network information or want to destroy the information. There are number of associated attacks by these intruders. To avoid this, the routing approaches incorporate the cryptography and authentication approaches to provide the secure and

reliable communication over the mobile network. This section has provided the characteristics exploration of mobile network along with capability analysis as well as discussion.

In this paper, A study of the mobile network characteristics, capabilities and issues is defined. The main focus of this paper is to identify the various challenges associated with mobile network. In this section, the mobile network characteristics are explored. These characteristics are defined along with relative impact. In section II, the work defined by different researchers in different areas of mobile communication. In section III, the challenges associated with mobile network are presented and discussed. In section IV, the conclusion and future scope of the work is presented.

## 2. RELATED WORK

In year 2012, Chirag Kumar has performed a work on the performance of mobile network in realistic environment. Author has analyze the work under different real time situations and defined work on different simulators. The work is here been checked on different scenario, shapes to attain the effective output from the system. The node analysis over the system is performed in obstacle condition. The work also include the network limitation identification so that the improvement over the network can be achieved in near future[1]. Another work on QOS optimization to resolve different issues in mobile network was considered by R.Lakshmi Priya in year 2009. Author defined a study work on the different ideas respective to the QOS optimization in mobile network. Author presented the work with different implementation work with qualitative restrictions. The work includes the comparative analysis to achieve the effective throughput from the work[16]. In year 2006, Patrick Stuedi presented a throughput analysis on multihop mobile network respective to the network capacity. The capacity is the major property, the perform the analysis based on network strength estimation based on physical parameters such as propagation, unidirectional links, scheduling etc. The work is based on the probabilistic capacity calculation by performing the graph scheduling over the network. The capacity analysis is defined under the realistic network model under different configuration model. The analysis is performed in ns2 environment based on throughput analysis on sink node[9]. In year 2007, J Abdullah presented a GA based QOS routing approach for the mobile network under the mobility constraint. The work is to analyze and improve the route quality under the random mobility model. The work also defined respective to the fitness variable and the GA based QOS optimization. The work is performed on the DSR protocol. The GA is the intelligent optimization tool that is used to achieve the efficiency as well as reliability over the network[6].

In year 2006, Dijiang Huang has explored a work on the traffic analysis under the unlink ability measure for a mobile network. The work is based on two major analytical approaches called statistical approach and the evidence based approach. These two approaches are used in a series to identify the unlink ability over the network as well as its effect over the network. The network transmission model respective to channel definition and analysis is presented in this work. The analysis is performed on the receiver side based on the evidence theory to obtain the maximum throughput over network[2]. In year 2009, A Simulation based analysis is performed on AODV protocol by Md. Monzur Morshed. The author has analyzed the network under the protocol specification for the different parameters. The parameter includes the efficiency, reliability, loop free routing etc. The Author has defined different network scenarios and performed the variation in terms of network delay, jitters etc and the relative effective is analyzed and presented in the form of graphs. The work is the verification of performance of AODV protocol under different network formations as well as the parameters [8].

In year 2008, Quan Le-Trung presented a work to analyze the effect of load balancing on mobile network. Mobile network is one of the busy networks. The author is includes the hybrid metric discussion based on quantitative analysis in terms of packet transmission ratio over the network under adhoc routing protocol. The work is about to perform analysis to get better performance in terms of packet delivery ratio and transmission delay at the cost of signaling overhead [15]. In year 2006, Moussa Ayyash presented a work on the performance analysis respective to the network infrastructure. The author has perform the analyze the network based routing protocol optimization under different metrics and the behaviors. The author has proposed a QOS virtual backbone to achieve the robustness for routing and monitoring. The QOS is basically selected based on routing and monitoring. The work also includes the stability and availability analysis respective to the bandwidth analysis [9].

In year 2009, Patrick Sondi has defined the protocol based service optimization for the voice communication in mobile adhoc network. The author has presented a network Extended OLSR protocol that will work on voice communication and provide the best effort routing and the high quality of service in the real time environment. The work also includes the confirmation for end to end delay analysis and the jitter constraint for the network formulation. The author has discussed the delivery ratio with better perspective[11]. In same year Thomas J. Sapienza has provided an evolutionary mechanism to optimize the quality of service for the wireless network. The work presented by the author includes the network design under parameter specification with wireless communication effects such as power control, routing failures, erratic development model etc. The work also includes the real world scenario specification under the scalability and some other

parametric models. The author has presented a polynomial complete model using the evolutionary programming to overcome the network delay and to improve the network effectiveness and the quality of service. The author also suggested the use of associative memories and the genetic algorithm during the QOS analysis phase.

Pedro Garcia Lopez has presented a topology specific approach to perform the service optimization for mobile network. The author has performed work on multicast network for the OLSR protocol. The work includes the improvement over the communication efficiency over the work with the change in network topology[12].

### 3. ISSUES IN MOBILE NETWORK

In this section, different issues faced by a network users while performing the communication in mobile network. The challenges are here independent to the communication operations. These challenges are defined under the consideration of network characteristics as well as associated capabilities. The restriction applied by various issues to these capabilities is also discussed in this section. Various issues associated with the mobile network is shown in figure 2.

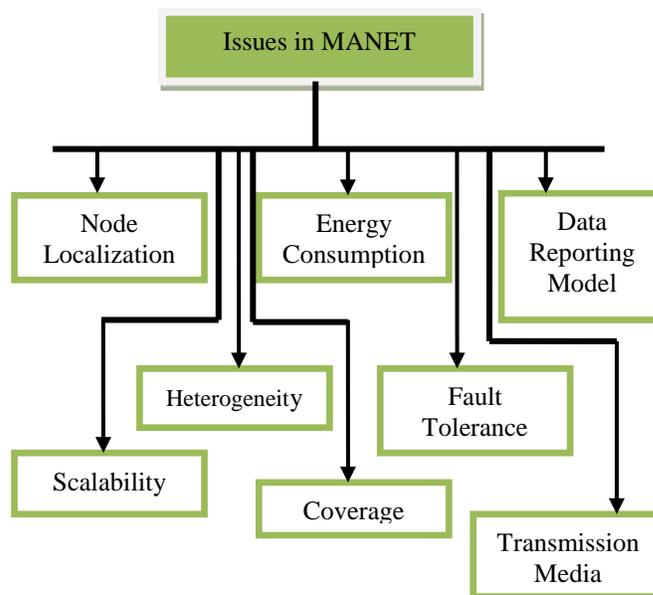


Figure 2 : Issues in MANET

The all issues are discussed in this section in detail.

#### A) Node Localization

Node localization is considered as the effective approach to define the physical positioning of nodes and to improve the network performance. The node localization itself is dependent on the network architecture as well as network scenario. The network architecture here represents the area boundation and the protocol specification. The localization of nodes is defined under the specification of the network area and the specific positioning. The node distribution is performed over the network at specific positions with parameter specifications. These parameters include the range specification, bandwidth specification and the protocol definition. This kind of localization also dependent to the network density and the network application. The application specific localization improves the network communication and throughput.

#### B) Energy Consumption

Some of the mobile network applications are energy specific, In these networks, the node are defined with specific initial energy. With each communication, some energy consumption is performed based on the contribution of the node to the communication. This kind of specification also includes the analysis of node participation to the network under energy effectiveness. The energy becomes the critical parameter that can result the network fault. Because of this routing and other

operations are defined under energy effectiveness. The emerge of each network node represents the network life. This energy distribution and consumption over the network can be equal or unequal and itself defines the criticality of the node as well as the network.

#### **C) Data Reporting Model**

This model represents the sensing to the network nodes patriotically so that the effective monitoring to the nodes will be obtained. This kind of analysis includes the event based adaptation to the network as well as to provide the data diffusion so that effective information collection and distribution will be performed. This kind of communication is able to identify the changes over the network and to provide the reliable network communication.

#### **D) Heterogeneity**

Heterogeneity represents the non similarity of network nodes. This non similarity can be in terms of node role or the node capability or node characteristics. The difference between the nodes can be identified in terms of criticality of node or the priority or nodes. This criticality and priority assignment is also defined based on the node role, communication parameters or the position of nodes. The role here describes the service level specification of the nodes. A node can be considered as the controller node or the end node or the intermediate node. The optimization algorithm to different kind of nodes is applied in different ways and under different parameters.

#### **E) Fault Tolerance**

A mobile network must be defined under fault adaptation. It means if the fault occur over the network, the network must be able to identify and prevent the fault and will be able to provide the effective communication even in fault network. The fault can be described as some error or the damage in the node or the communication capabilities of nodes. The network must be able to provide the reliable communication if fault occur during the communication. Some faults are application adaptive as well as some operation adaptive faults can also be identified over the network.

#### **F) Scalability**

As the network size increases, the criticality of the network also increases. It means, there is the more requirement of infrastructure and the effective node communication. The coverage level is also affected because of scalability. There must be a healthy ratio between the network node and network area. Low area size and large number of nodes increases the network congestion and the high ratio increases the chances of non cooperation.

#### **G) Coverage**

The coverage is defined the communication range of nodes. A node can communicate maximum upto its coverage range. This range is defined under the physical parameters and defined the effective connectivity with network nodes. As the connectivity level is high more adaptive chances of reliable communication.

#### **H) Transmission Media**

A Mobile network provides the effective communication media to perform the wireless communication. This kind of communication is defined adaptive to the communication vectors such as fading rate, error rate analysis etc. These parameters also include the bandwidth estimation, MAC protocol design and the communication rate analysis. The reliability and integrity of network is defined to improve the network communication.

### **4. CONCLUSION**

In this paper, a study based work is defined to identify the strength and issues of the mobile network. In the earlier stage, the network characteristics are explored and later on the issues associated with these characteristics are defined and explained.

## References

- [1] C. Kumar, "Towards Realistic Performance Evaluation of Mobile Ad hoc Network", World Conference on Information and Communication Technologies, pp 287-291, 2012
- [2] D. Huang, "Traffic Analysis-based Unlinkability Measure for IEEE 802.11b-based Communication Systems", Proceedings of the 5th ACM workshop on Wireless security, pp 65-74, 2009
- [3] <http://en.wikipedia.org/wiki/>
- [4] [http://en.wikipedia.org/wiki/Mobile\\_ad\\_hoc\\_network](http://en.wikipedia.org/wiki/Mobile_ad_hoc_network), last visited 12, Apr, 2010.
- [5] <http://www.ece.iupui.edu/~dskim/manet/>
- [6] J. Abdullah, "Node Connectivity Index as Mobility Metric for GA based QoS Routing in MANET", Proceedings of the 4th international conference on mobile technology, applications, and systems and the 1st international symposium on Computer human interaction in mobile technology, pp 104-111, 2007
- [7] K. Kumar, "Intrusion Detection in Mobile Ad-hoc Networks", University of Toledo, 2009.
- [8] M. Monzur Morshed, "Simulation and Analysis of Ad-hoc On-demand Distance Vector Routing Protocol", Proceedings of the 2nd International Conference on Interaction Sciences: Information Technology, Culture and Human , pp 610-614, 2009.
- [9] M. Ayyash, "Preemptive Quality of Service Infrastructure for Wireless Mobile Ad Hoc Networks", Proceedings of the international conference on Wireless communications and mobile computing, pp 707-712, 2006.
- [10] P. Stuedi, "Computing Throughput Capacity for Realistic Wireless Multihop Networks", Proceedings of the 9th ACM international symposium on Modeling analysis and simulation of wireless and mobile systems, pp 191-198, 2009.
- [11] P. Sond, "Voice Communication over Mobile Ad Hoc Networks: Evaluation of a QoS Extension of OLSR using OPNET", Asian Internet Engineering Conference, pp 61-68, 2009
- [12] P. Garcia Lopez, "Topology-Aware Group Communication Middleware for MANETs", Proceedings of the Fourth International ICST Conference on COMMunication System softWARE and middleware, 2009.