

ANALYSIS OF QOS PARAMETER IN AODV A DSR IN MOBILE AD HOC NETWORKS

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Abstract: Providing QoS in the context of Ad Hoc networks includes a very wide field of application from the perspective of every level of the architecture in the network. Saying It in another way, It is possible to speak about QoS when a network is capable of guaranteeing a trustworthy communication in both extremes, between any couple of the network nodes by means of an efficient Management and administration of the resources that allows a suitable differentiation of services in agreement with the characteristics and demands of every single application. The principal objective of this article is the analysis of the quality parameters of service that protocols of routing reagents such as AODV and DSR give in the Ad Hoc mobile Networks; all of this is supported by the simulator ns-2. Here were going to analyze the behavior of some other parameters like effective channel, loss of packages and latency in the protocols of routing. Were going to show you which protocol presents better characteristics of Quality of Service (QoS) in the MANET networks.

1 INTRODUCTION

Ad hoc networks (MANET) (Tupakula et al., 2011; Munoz, 2004) are formed by a group of mobile nodes (the host, router), they can autoorganize themselves to communicate among them. All these devices that belong to Networks transmit packages and each of their nodes have to take decisions when they communicate with other nodes. The MANET Networks do not have a static infrastructure. Each of its nodes can take part in the processes of routing or authentication and distribution of resources; therefore, the management of its nodes is done in a distributed form, allowing the communication of other nodes that do not have It in a direct way, for these reasons, these types of Networks are vulnerable to assaults and risks such as: (Karygiannis and Owens, 2002) denial of service (DOS), steal of service, malicious hackers, malicious code and even espionage.

The paper is constructed this way: The section I contemplates an introduction to the mobile networks in relation to the Ad Hoc quality and safety. Section II develops the condition of the art belonging to the topic. Section III specifies relevant steps to characterize the quality in the mobile Ad Hoc networks. Section IV simulates and presents results on the differentiation of the protocols DSR and AODV for effects

of the quality of the Ad Hoc networks. Finally the section V specifies conclusions on QoSs parameters analyzed in relation to the protocols AODV and DSR.

2 BEEN OF THE ART

2.1 Ad Hoc Mobile Networks

In the network Ad Hoc fig. 1, the way of communication is broadcast (sending a message from point A to B, this one comes also to all the nodes, initiating in the origin and propagating to the whole network) (Venkatraman and Agrawal, 2003). The characteristics of a MANET are: links of limited bandwidth and changeable capacity, limitations of energy and capacity. fig.2, type of Network Ad Hoc processing in the nodes and physical limited safety. Its requirements of safety are the same that a traditional network, since they need confidentiality, integrity, authentication, not repudiation and availability (Boukerche and Boukerche, 2008; Jose et al., 2009; Tupakula et al., 2011), but these characteristics make safety requirements more complex to administering.

Douligeris and Serpanos (Douligeris and Serpanos, 2007) consider as examples of applications of

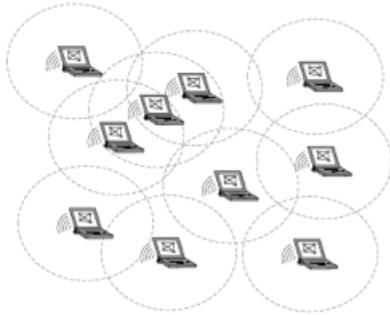


Figure 1: Type of network ad hoc.

the Ad Hoc networks: recovery of disasters, missions of search and rescue, military operations; and, between others to the distributed networks, dynamic communication of group, communication between mobile robots, etc.

2.2 QoS of Routing in Ad Hoc Networks

According to Douligieris and Serpanos (Douligieris and Serpanos, 2007) these networks lack total safety in the control of physical access. The Internet is one of the principal factors that exhibits to the mobile devices to assaults like: refusal of service, injection of malicious code, interception of the network for mans assault and fraud.

The problem of the Quality of Service (QoS) in mobile Ad Hoc networks has been and is one of the big problems in this type of networks. In spite of it the majority of protocols of routing for mobile Ad Hoc networks, such as AODV [1], DSR [10] are designed without considering in an explicit way the quality of the service of the routes that they generate. QoS of routing in Ad Hoc networks is studied and spreadin recently (Zhang and Gulliver, 2005; Zhu and Corson, 2004; Lee et al., 2000; Chen and Nahrstedt, 1999; Hsu et al., 1998; Leung et al., 2001; Mohapatra et al., 2008; Park and Corson, 1997; Chen et al., 1999).

The quality of service is measured basically in agreement with parameters as: throughput, latency, loss of packages, etc. With the help of the QoS it is possible to discriminate against traffic giving major or minor efficiency in the transmission of the information. When one speaks about quality of service, it is possible to say that the protocol of routing is capable of finding the way towards the destination and of delivering information in a reliable form. Aspects as loss of packages, latency in this type of networks, must be almost void especially in applications of real time (Lane et al., 2011).

3 RELEVANT STEPS IN THE AD HOC NETWORKS

3.1 Comparison between Routing Protocols

The protocols that are object of study and simulation are AODV and DSR considered inside their classification as reactive protocol.

Important parameters of the quality of service

- **Throughput** - Is the quantity of information got for the destination in a time determined across a physical or logical way in a network.
- **Latency** - This parameter is measured in units of time and refers to the total passed time, since the package is transmitted by the origin until it comes to its destiny.
- **Loss of Packages** - This happens for the congestion of channels of transmission and because of this the packages do not reach their final destination.

3.2 AODVs Analysis (Ad Hoc on Demand Distance Vector)

Characteristics.

- Only when it needs to communicate, the process of discovery of route begins.
- Major time in the delivery of packages.
- It supports a locally table of routing for the already known destinies.
- It only supports the use of unidirectional links.

3.3 DSRs Analysis (Dynamic Source Protocol)

Characteristics.

- Has routing in the origin.
- The packages include a head-board of information about the nodes that they are going to cross.
- It obtains multiple possible ways towards the destination.
- Every node keeps a cache memory of routes of its neighbors.
- It detects the loss of conectividad and requests a new immediate discovery of route.

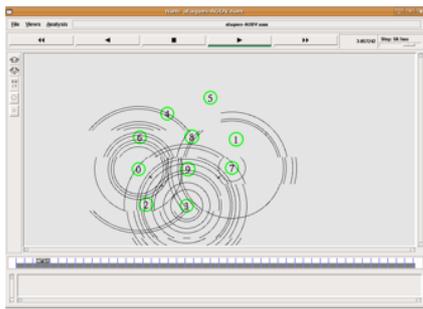


Figure 2: Environment of simulation with NS2.

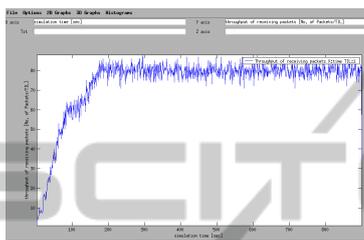


Figure 3: Receive packets AODV.

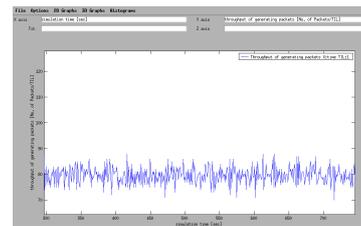


Figure 5: Throughput AODV.

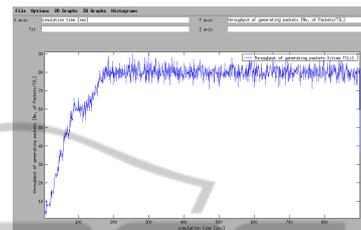


Figure 6: Throughput DSR.

4 SIMULATION AND RESULTS

4.1 Stage

The simulation of the Ad Hoc protocols has been carried out with the tool of simulation of network ns2 (network simulator). This Ad Hoc network consists of a topology with 10 nodes, in a time of simulation of 40 seconds, where two nodes communicate using the protocol of transport TCP across intermediate nodes.

In this stage, the advantages and disadvantages that the protocols AODV and DSR present are demonstrated, as it is detailed in the figures 3, 4, 5, 6, 7 and 8.

4.2 Evaluation of Results

The principal results obtained of the simulation are in the following tables I, II y III: In the Table I,

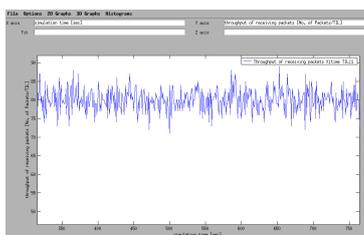


Figure 4: Receive packets DSR.

DSR presents a highest number of lost packages that AODV, but proportional to the generated packages the lost packages is minor in DSR that in AODV, thinking that DSR generates 1390 and alone AODV 849 packages, in consequence DSR is more efficient. The lost of packages is higher in DSR that in AODV, but DSR loses packages in agreement to the number of sendings, if we calculate mathematically DSR sends 690 packages and loses 13 packages AODV at the time on having sent 401 packages should lose 7,55 packages and like we can see the simulation throws 8 packages lost in AODV at the time we can say that they are similar. We can also notice a similar behavior in both protocols as for the erasing of packages during the transmission. See Table II. In the simulation is observed that the delay in AODV is minor, which indicates that this protocol presents better quality of service in his routing, since the rate of lost packages is minor that DSR, and the delay that it presents in the communication between the origin and destination in his maximum and minimal point, continues being a minor in AODV. Table III.

The throughput in AODV demonstrates that the communication is established more soon than in DSR. The throughput in DSR appears 30 seconds after the simulation had started, which indicates that in this time it manages to communicate with the destination and this value is two points during the rest of the simulation; with AODV the throughput begins at the 0 seg.

Table 1: Packets management (DSR - AODV).

Protocol	Generated packet	Sent Pack-ets	Lost packets
DSR	1390	1390	23
AODV	849	846	17

Table 2: Communication from the node 2-5.

Protocol	Sent packets	Lost Pack-ets	Deleted packets
DSR	690	13	0
AODV	401	8	0

Table 3: Delay between the node 2-5 (DSR - AODV).

Protocol	Minimum delay	Average delay	Maximum delay
DSR	0.017022 seg.	0.271257 seg.	0.329094 seg.
AODV	0.004172 seg.	0.030682 seg.	0.193194 seg.

5 CONCLUSIONS

On the basis of the analysis, simulation and results there concludes that:

- The performance of the protocols of routing reagents depend on the stage that appears in a simulation. In normal cases as it appears in the obtained results, DSR presents better performance that AODV. This protocol in the routing with QoS produces a major performance, minor late and better effort of the protocol.
- DSR organizes enough good in networks where less than one hundred of nodes exist. In these networks DSR is specially useful and highly adaptable in small environments.
- Among the protocol AODV and DSR, the protocol AODV is more adapted for the quality in networks by top mobility and they adapt to big and complex environments.
- For QoSs provision in Ad Hoc networks we must provide of an adaptative model of QoS where the applications have to be able to adapt to the conditions and to the availability of resources of the Ad Hoc, which are highly dynamic. These models will have to have jointly certain elements: control of admission, control of congestion, police function, some mechanism to differentiate packages and some mechanism that allows us to know the condition or state of the network.

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