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Designing the E-AODV (E as Enhanced) Routing Protocol to Improvise it During the Nodes or Links Fails

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Abstract - By the end of this decade we will be entering into the era of thousand cores SoCs. 3D integration technologies have opened the door of new opportunities for NoC architecture design in SoCs providing higher efficiency compared to 2D integration by appropriately adjusting the increased path lengths of 2D NoC. The application to core mapping on NoC architecture can significantly affect the amount of system's dynamic communication energy consumption. The considerable amount of energy savings can be achieved by appropriately optimizing the application to core mapping in NoC architecture. This paper presents a Branch-and-Bound heuristic for smart application to core mapping in 3D Mesh NoC architecture.

Keywords : *reactive, proactive, hybrid protocol, adhoc ondemand distance vector (aodv) routing , enhanced adhoc on demand distance vector (e-aodv), mobile adhocnetwork (manet), enhanced path search operation(epso), acknowledgement to intermediate nodes(acki),acknowledgement to source nodes(acks), source (s) ,destination (d),delay factor (df), shortest distance todestination (sdd)..*

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Designing the E-AODV (E as Enhanced) Routing Protocol to Improvise it During the Nodes or Links Fails

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Abstract- Networks are being used in various areas and the demand of user's nowadays has motivate the emergence of the mobile adhoc network (MANET). In this age of network, most challenging task is to deliver the packet successfully with dynamic network, delay, node and links fails restraint. And to fulfill the above required task, protocol should be used effectively and efficiently .In this paper, we had successfully design the Enhanced-AODV routing protocol which had improvised the performance of AODV and its other several factors like throughput, number of packets delivered, load delay,overhead, packet delivery even in case of frequent path breaks due to nodes or links failure ,dynamic nature etc.

Keywords: reactive, proactive, hybrid protocol, adhoc on demand distance vector (aodv) routing , enhanced ad hoc on demand distance vector (e-aodv), mobile adhoc network (manet), enhanced path search operation (epso), acknowledgement to intermediate nodes(acki), acknowledgement to source nodes(acks), source (s) , destination (d),delay factor (df), shortest distance to destination (sdd).

I. Introduction

Wireless networks can be broadly classified into infrastructure based wireless network and infrastructure wireless networks or Ad-hoc networks. In Ad-hoc networks, the nodes are mobile and routing between source and destination node is achieved by intermediate nodes acting as routers if it not in radio range. As Ad-hoc networks are highly dynamic, routing protocols plays a crucial role to achieve quality of service. Other important factors to be considered in Ad-Hoc networks are dynamic networks topology, frequently of network updates, scalability, security and energy required. Basically MANET [1] is a group of wireless computing devices like Laptop, Mobile phone, Personal Digital Assistant (PDA) or similar devices. In Ad-hoc networks routing protocols are broadly classified into proactive (table driven) routing protocol, reactive (On-demand) routing protocols and hybrid protocols.

In proactive routing each node in the Ad-hoc network maintains a table or tables containing routing information of the network. Any node that needs to transmit data can start transmitting data using routes already present in the routing table enabling immediate data transmission. Popular proactive routing protocols include Destination sequence distance vector (DSDV)[2] routing protocol ,Wireless routing protocol (WRP)[3] and Optimized link state routing protocol (OLSR)[3] .The advantages of proactive routing protocols is it update its routing table irrespective of data traffic.

Unlike table driven routing protocols, Reactive protocols update routing information only when a route is required by a source node to transmit data. Reactive routing protocols reduce the control overhead which is advantageous in high mobility networks whereas periodic updates in routing information leads to significant increase in networks overheads even when there is no data transmission between nodes in the networks. Some of the popular Ad-hoc routing protocols falling in this category are Dynamic Source Routing (DSR)[4], Ad-hoc On demand Distance Vector (AODV)[4][5]routing and Temporarily Ordered Routing Protocols (TORA)[4].

AODV is considered to be the best out of many Reactive protocols but its performance degrades when nodes or link fails as with the dynamic mobility of nodes, damaging of nodes etc.

In this paper we had successfully upgrades several factors like performance, throughput, load delay etc. even at time of nodes or links fails in AODV routing protocol by enhancing in its algorithm.

II. Aodv Routing Protocol

AODV is an adaptation of Destination Sequenced Distance Vector (DSDV) protocol used in wired networks and overcomes the shortcomings of DSDV in wireless environment. AODV eliminates the counting to infinity problem faced in other distance vector protocols by implementing a sequence number. Unlike DSR which carries the entire route between the source and destination in the packet, the nodes in AODV carry only the next hop information corresponding to each data flow. Being a reactive routing protocol route is discovered as and when needed and the discovered routes are maintained as long as they are required.

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A route discovery is initiated [6] when one of the nodes in the network wants to send a data packet to another node. If an active route is not available AODV initiates the route discovery process with the source node broadcasting a route request message (RREQ) to find a route to the destination. The route is found either with the RREQ reaching the destination or an intermediate node in the network which has "fresh enough" route to the destination with the sequence number equal to or greater than the sequence number contained in the RREQ. Once a valid route is found it is made available by a route reply (RREP) message back to the originator of the RREQ. Once the route is established the nodes monitor the state of the links continuously. If a link breaks in an active route, a route error message (RERR) is sent to the other nodes of the link breakage. This initiates a new route discovery process.

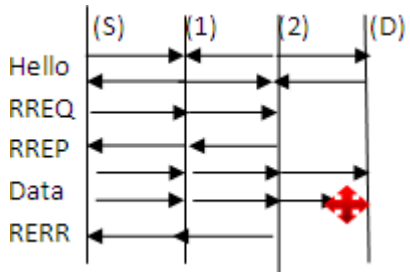

Figure 1 : Flow chart of AODV Protocol messaging

The advantages of AODV routing protocol is the selection of the least congested route instead of the shortest path. AODV supports both uncast and multicast data transmission. Performance is not drastically affected even if the topology changes continuously. Since source routing is not used, there are no additional overheads in the data.

III. The Previous Algorithm And Their Problem

From the recent up gradations in the AODV routing protocol its had been cleared that they are using the shortest path to start the transmission [7] and also consider or selection of the path on a factor like weak node [8] , delay function [9] .and at the time of path breaks, due to node or link fails, several handling procedure or algorithm had been developed so far from traditional [10] to improvising the local repair procedure [11] ,selecting [12]and performance evaluation[13] node disjoint path identifying the performance [14] , Security [15][16] ,and also modifying [17][18]the traditional and improvising local repair algorithm which will increase packet delivery ,delay, and other several factors.

By considering all the recent updating in AODV, they didn't provide result satisfactory or they provide but under certain constraints. So it is needed to improve AODV with all recent updates to achieve better performance, throughput and packet deliver and several other factors which can be achieve under any situation or constraints and also even frequent path breaks due to node or links broken.

IV. The Proposed Algorithm

The proposed algorithm will be as follows –

a) Send hello packet from source (RREQ) to discover all path available from source to destination.

b) During discovery phase,

i. Every nodes must updates its cell in its routing table (named as delay factor)

ii. Every node must update its cell from its routing table (name as short distance to destination) by calculating the minimum number of hops to reach to destinations.

c) During the propagation phase, shortest path is selected to begin the packet transmission and assign 10 as grade to all the intermediate nodes in this path

d) Depending upon the acknowledgment of every packet received its degrades or upgrades grade values assigned to them.

e) As grades reaches to 0, enhanced path search operation will start on the basis of following steps –

Assigning the grade equivalent to 10 to all nodes to a selected path whose 'ng' (nodes grades) is smaller or equivalent to threshold value 'th' and ng is calculated as specified in formula 1

$$ng = \frac{\text{Shortest path distance to destination}}{\text{Delay functions}} \quad \text{--formula 1}$$

In order to evaluate or compare several factors between proposed and previous algorithm, both the algorithm is implemented in Network simulator in Windows by creating as Linux environment .After executing both the algorithm, several factors had been compared in Table 1 specified below by considering 50 nodes and for 100 seconds.

Table 1 : Overall Summary

Parameter	Proposed	Previous
SEND	6371	6142
RECV	6087	5760
ROUTINGPKTS	4541	6156
Packet Delivery Fraction (PDF)	95.54	93.78
Normal Routing Load (NRL)	0.75	1.07
Average e-e delay(ms)	215.88	378.98
No. of dropped data (packets)	321	454
No. of dropped data (bytes)	296384	425828

By considering the above table its had been clear that the proposed algorithm provides better aspects as compare to previous algorithm. And on the

basis of the above table many compared graphs can be draw which really proves that it is better than previous.

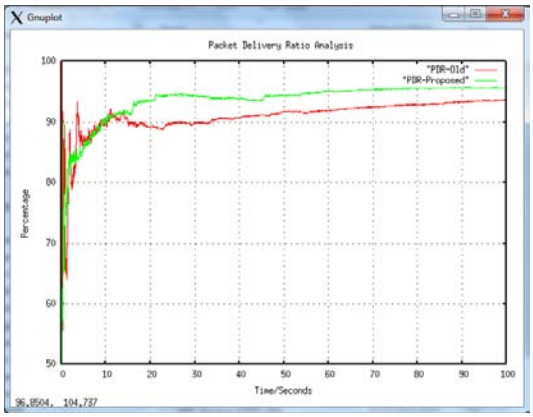

Figure 2 : Packet Delivery Ratio Analysis

In graph Fig.2, shows that proposed send more number of packet as compare to old .And also ensure that as time is increase its packet delivery ration will increase.

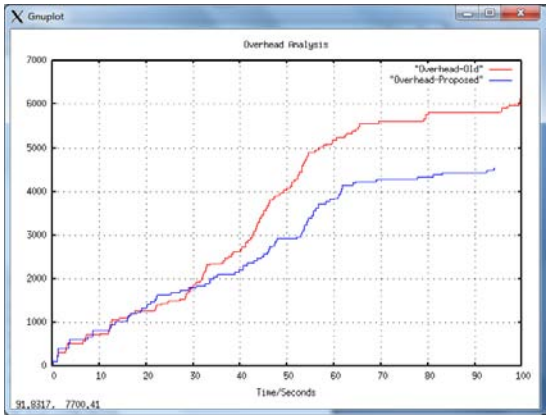

Figure 3 : Overhead Analysis

In graph Fig.3 ,shows that overhead packets is higher in old as compared to proposed algorithm which can degrades the performance .And also ensure that less number overhead as time is increase.

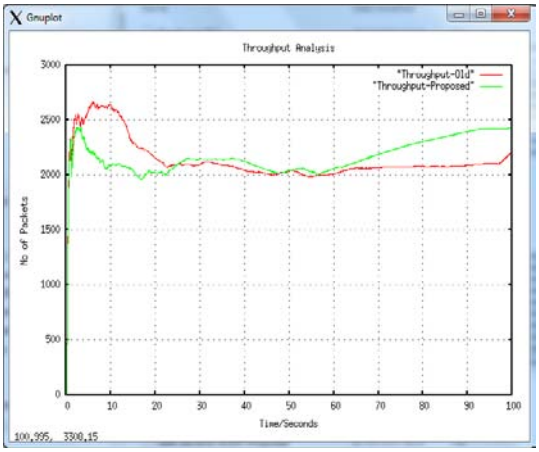

Figure 4 : Throughput Analysis

In graph Fig.4, shows that throughput of proposed algorithm will be increase as time than old algorithm and thus its efficiency will increase.

Now we compared on the basis of UDP connection in a graph Fig.5 and Fig. 6 which may have impact on the network

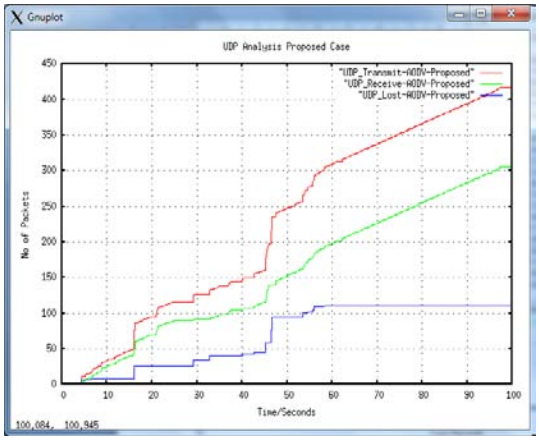

Figure 5 : UDP Analysis Proposed Scheme Time

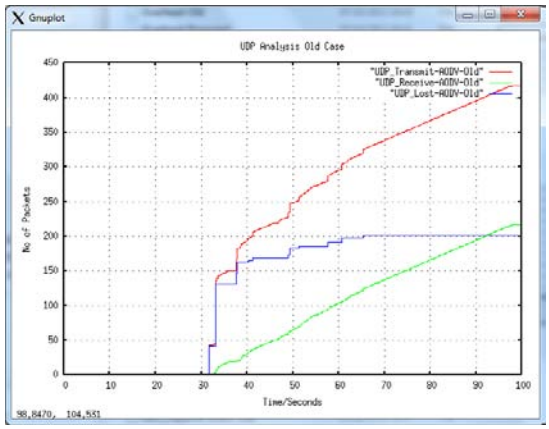

Figure 6 : UDP Analysis Old Scheme Time

The above graph Fig. 4 and Fig. 5, shows that proposed algorithm shows that lost of UDP packet is less than old algorithm and received packet received is high than old.

Now we compared on the basis of TCP connection in a graph Fig.7 and Fig. 8 which may have impact on the network.

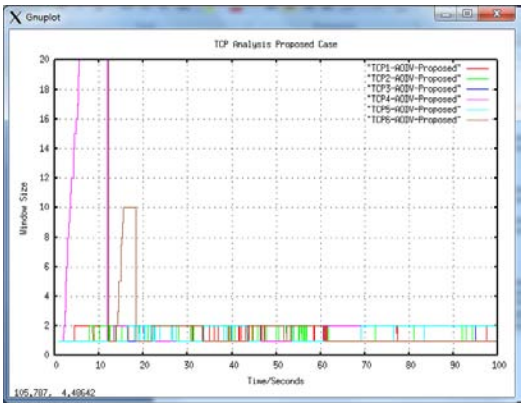

Figure 7 : TCP Analysis Proposed Scheme Time

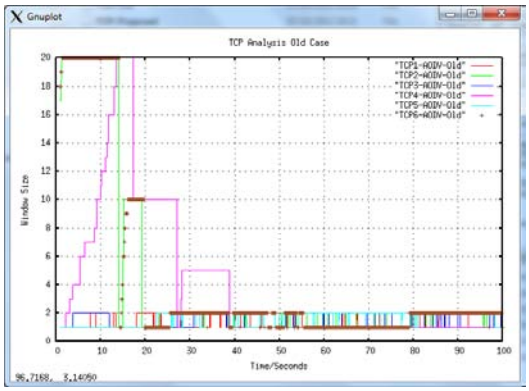

Figure 8 : TCP Analysis Old Scheme Time

V. Conclusion

The above simulation result proves that the proposed algorithm works highly effectively and efficiently as on compared with old algorithm and therefore upgrading the performance, throughput, delay, load factor, packet ratio delivery fraction ,throughput etc and also even at the time of node or links fails or even in case of mobility factor.

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