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Review on Congestion Control for Multipath Routing in Wireless Sensor Network (WSN)

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Abstract—The congestion problem in Wireless Sensor Networks (WSNs) is quite different from that in traditional networks. Most current congestion control algorithms try to alleviate the congestion by reducing the rate at which the source nodes inject packets into the network. In most of the existing works either detection of congestion or scheme for congestion control in wireless sensor networks are presented. A very few works have taken in to account of both congestion detection and congestion control. The congestion control using multipath routing in wireless network is performed by performing of performance metrics. From review will implement multipath routing in wireless sensor network & evaluating the performance metrics to control the congestion.

Keywords-Congestion control, Multipath routing,WSN.

1.INTRODUCTION:-

WIRELESS SENSOR NETWORK

The WSN is built of "nodes" from a few to several hundreds or even thousands, where each node is connected to one sensors. Each such sensor network node has typically several parts. A Wireless sensor network (WSN) is a set of tiny nodes that are equipped with embedded computing devices interfacing with sensors/actuators. They generally use short range wireless transmitters and they act autonomously but cooperatively to route data, hop-by-hop towards a central node called sink, or base station. The development of wireless sensor networks was motivated by military applications such as battlefield surveillance; today such networks are used in many industrial and consumer applications, such as industrial process monitoring and control, machine health monitoring, and so on.

Multipath Routing

Multipath routing is the routing technique of using multiple alternative paths through a network, which can yield a variety of benefits such as fault tolerance, increased bandwidth, or improved security. . The multiple paths computed might be overlapped, edge-disjointed or node-disjointed with each other. The Multipath routing is an efficient technique to route data in wireless sensor networks (WSNs) because it can provide reliability, security and load balance, which are especially critical in the resource constrained

system such as WSNs.. The multipath routing technique which has demonstrated its efficiency to improve wireless sensor performance is efficiently used to find alternate paths between sources and sink. . This approach is considered as one of the existing solutions to cope with the limitations of routing . In this section, the benefits and elements of multipath routing will be explained. The different multipath routing protocols are as fallaows AOMDV,ORMAD ,I2MR, SMR.

CONGESTION CONTROL

Congestion is an important issue that can arise packet switched network. Congestion is situation in Communication Networks in which too many packets are present in a part of the subnet performance degrades. Congestion Control refers to techniques and mechanisms that can either prevent congestion, before it happens, or remove congestion, after it has happened. When one part of the subnet becomes overloaded, congestion results. Congestion in Wireless Sensor Networks (WSNs) has negative impact on the performance, namely, decreased throughput and increased per-packet energy consumption, The congestion problem in WSNs is quite different from traditional networks.

2.LITERATURE REVIEW

The work proposed in [1] of IEEE transaction by Shancang Li, Shanshan Zhao, Xinheng Wang, Kewang Zhang, and Ling Li shows that evaluation metric, path vacant ratio, is proposed to evaluate and then find a set of link-disjoint paths from all available paths. A congestion control algorithm that can adaptively adjust the load over multipaths is proposed. A threshold sharing algorithm is applied to split the packets into multiple segments that will be delivered via multipaths to the destination depending on the path vacant ratio. Multipath routing protocols such as ad hoc on-demand multipath distance vector (AOMDV) Temporally Ordered Routing Algorithm (TORA),on-demand multiple route maintenance in AODV extensions (ORMAD) and interference minimized multipath routing (I2MR) are the most common examples in ad hoc networks. In the paper [2] Fengyuan Ren, Sajal K. Das and Chuang Lin propose a traffic-aware dynamic routing (TADR) algorithm to route packets around the congestion areas and scatter the excessive packets along multiple paths where the idle or underloaded nodes are sufficiently utilized in response to congestion under the fidelity requirements. present a solution that sufficiently exerts the idle or under loaded nodes to alleviate congestion and improve the overall throughput in WSNs. The congestion problem in Wireless Sensor Networks (WSNs) is quite different from that in traditional networks. In the paper [3] Claudio Estevez Ethernet-Services Transport Protocol (ESTP) has proven relieve the effects of the decrease algorithm by dynamically adjusting the transmission rate according to the level of congestion estimated in the network. It should be emphasized that most protocols detect congestion, but do not estimate the level of congestion. In the paper [4] Fernando Paganini and Enrique Mallada use TCP-FAST for congestion control and develop a multipath variant of the distance vector routing protocol RIP. Author demonstrate through simulations the collective behavior of the system, in particular that it reaches the desired equilibrium points of the distance vector routing protocol RIP. In particular that it reaches the desired equilibrium points. In the paper [5] Lucian Popa , Costin Raiciu approach consists of a multipath routing protocol, Biased Geographical Routing (BGR), and two

congestion control algorithms, In-Network Packet Scatter (IPS) and End-to-End Packet Scatter (EPS), which leverage BGR to avoid the congested areas of the network. Author propose a solution to improve fairness and increase throughput in wireless networks with location information.

3.METHODS OF CONGESTION CONTROL

1.Congestion Detection

The detection mechanism is based on buffer occupancy and wireless usage, exponentially averaged to eliminate noise. Wireless usage is measured by periodically sampling wireless medium. detects congestion by measuring the queue length. It controls congestion by combining the techniques i.e; hop-by-hop flow control, source rate limiting. Fusion claims to achieve good throughput and fairness at high offered load. Here, an efficient congestion control scheme will be proposed, which is able to adaptively schedule the load distributive to multiple paths and reduce the congestion on multipaths to avoid packet loss and thus enhance the throughput, security, and reliability of traffic. The proposed congestion detection scheme can provide service ratio and congestion notification when it occurs.

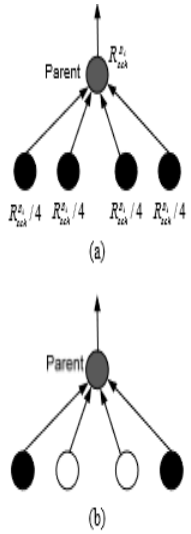

Figure 3. Any of the child nodes is termed as i, and the grey colored node is the parent of i, (a) All child nodes are active (black colored nodes) (b) Two child nodes are idle (white).

2.Congestion control & notification

A hop-by-hop rate adjustment mechanism to tune the congestion on multipaths, where the output rate at a node on a particular path m is controlled by adjusting a scheduling rate Risch. The scheduling rate is defined as how many packets are scheduled at a time interval from the priority queues on a particular path e.g., if node ni has n parent nodes, then the scheduling rate at node. By doing this, the packet loss can be decreased. In this design, a congestion notification scheme is used, in which each node ni is able to piggyback the packet scheduling rate Rsch, the number of child nodes C, and the packet service rate Rs in the packet header. The scheduling rate is defined as how many packets are scheduled at a time interval from the priority queues on a particular path.

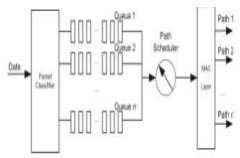

Fig. 2. Congestion path schedule.

nodes of n_i find that the packet service ratio of parent n_j is lower or greater than a threshold, then the multipath rate control procedure will be triggered.

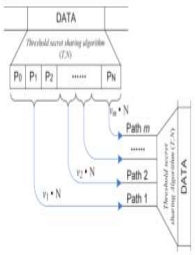

Fig. 3. Packet delivery scheme.

3.Congestion cancellation

The congestion cancellation procedure empties its buffer and reduces the amount of backlogged data packets to allow the current data packet to be transmitted before sending the CONGEST message to the source node. When a CONGEST packet is received by the source node, the delivery rate is adjusted to a lower pre defined rate.

In this paper we will propose Development of routing based congestion control ,Development of multipath routing protocol, and Congestion detection in network. The congestion caused buffer overflow in the node and can result in packet loss .Another is link level congestion that is related to the wireless channel shared by several nodes. congestion in wireless sensor network has negative impact on the performance, namely, decreased throughput & increased per- packet energy consumption technique for controlling the congestion control with help multipath routing in wireless sensor network. Author then classify the congestion into three cases such as high level, medium level and low level congestions depending upon which they go either for a multipath routing approach or a rate reduction technique. We will implement multipath routing in wireless sensor network & evaluating the performance metrics to control the congestion .

CONCLISION:- Author have presented an efficient multipath congestion control mechanism for congestion control for multipath routing in wireless sensor network node. From the references of paper author performed performanace metrics like i) throughput ii) routing delay iii)Energy efficiency.In our congestion detection approach Author follow a combined congestion estimation

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