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Design of Balanced Data Reliable Transport Protocol For Underwater Wireless Sensor Network

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ABSTRACT: Underwater sensor networks are significantly different from terrestrial sensor networks. Acoustic channels are used for communication and most sensor nodes are mobile due to water current. These distinctions feature underwater sensor networks with low available bandwidth, large propagation delay, highly dynamic topology, and high error probability, which pose many new challenges for reliable data transport in underwater sensor networks. A protocol, called balanced data reliable transport (BDRT), to achieve reliable data transfer in underwater sensor network scenarios. It adopts efficient erasure codes, random forward-error correction codes transferring encoded packets block by block and hop by hop. Based on this model, we can set the block size appropriately to enable BDRT to address the mobile nodes. We conduct simulations to evaluate our model and BDRT. The results show that this model can closely predict the number of packets actually needed, and BDRT is energy efficient, and can achieve high channel utilization.The proposed mechanism is simulate in Ns2.It is evaluated in terms of delay, energy and throughput.

Keywords: hop by hop method, block by block method ,wireless sensor networks**.**

1. INTRODUCTION

Recent advances in wireless communications have enabled the development of low-cost, low-power and small size wireless sensor nodes performing significant sensor processing,computation,and network self configuration to achieve a long life and scalable networks. Wireless sensors have been used in hazard alarms, monitoring , tracking wild life, habitat monitoring, and many more applications. Certain applications such as rescue management, emergency care and military applications require secure information transfer between the source an destination. Considering an example where sensors are used to sense an obstacle while reversing a car and reports to the driver. Here the monitoring is done remotely.To consider another example where sensors are used under water for detecting the earth quack an highlevel vibrations which causes massive destruction to the living world. Here efficiency plays a major role where the sensors should have sufficient energy .less delay time and throughput. These can be achieved through hop by hop method or block by block method which saves energy , reduces delay time. These issues can be solved by this proposed SDRT protocol.

1.1 MOTIVATION

Once when a wireless sensor is placed under water it is not that easy to repair it.Therefore the sensor should last long as much as possible inorder to save time and cost. Hence to achieve the previously mentioned goal it has to perform

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both effectively and efficiently .The existing method is not a efficient one which consumes lots of energy and especially the delay time is more. And the rate if successful message delivery over a communication channel should be good too The major aim of this work is to make sure that the sensors consume less power ,the delay time is less and to increase the rate of successive data transfer.

The major objectives are as follows:

1. To reduce the intermediate /traffic nodes so that only less power is consumed.
2. To make sure that the delay time is less
3. To increase the rate of message transfer over a network.

2.BACKGROUND AND PROPOSED SCHEMES

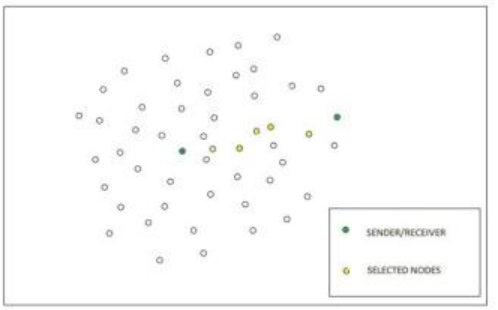

Fig.1. An Example Sensor Network Under Hop-By-Hop Method.

Figure 1shows that data has been transferred from source to destination in a effective manner where only two intermediate node has been used. Normally a traditional SDRT protocol uses hop-by-hop method to effectively transfer the data,but the traditional protocol uses atleast 4 nodes in between the source and the destination to transfer the data.

In SDRT, a data source first groups data packets into blocks of size *n*, i.e., there are *n* data packets in each block. Then the source encodes these blocks of packets, and sends the encoded blocks into the network. The data packets are

This session describes the hop by hop method and reviews on the existing work:

2.1 HOP-BY-HOP METHOD:

Hop-by-hop method is a principal of controlling the flow of data in a network. With hop-by-hop transport, chunks of data are forwarded from node to node in a store-and-forward manner. As hop-by-hop transport involves not only the source and destination node, but rather some of the intermediate nodes as well, it allows data to be forwarded even if the path between source an destination is not permanently connected during communication.

forwarded from the source to the destination block by block and each block is forwarded hop-by-hop. In each hop-by-hop relay, the sender keeps sending the encoded packets until receiving a positive feedback from the receiver. While receiving packets, the receiver tries to reconstruct the original data packets. If the reconstruction is successful, it sends back a positive feedback. On reception of a feedback, the sender stops sending packets, while the receiver encodes the original data packets again and relays them to the next hop. Here more than four nodes have been used for data transfer.

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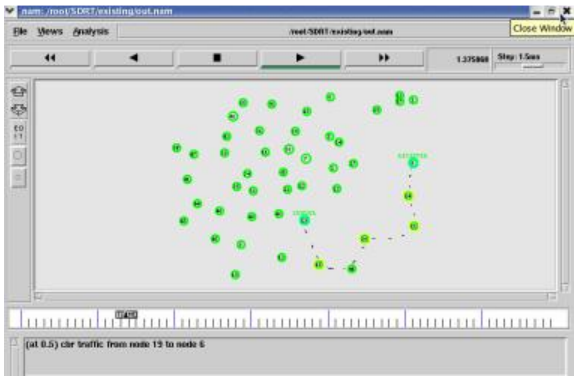

Fig.2. Existing protocol simulation diagram

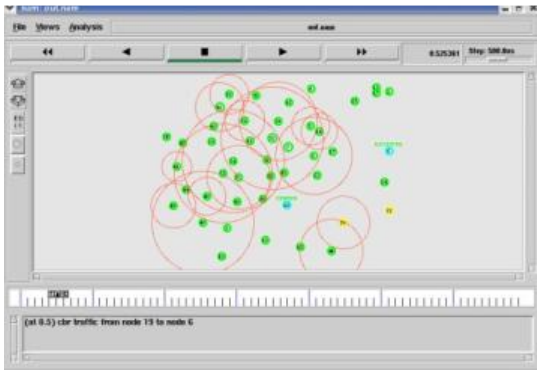

Fig.3. Simulation Process

The target sensor networks are relatively dense, with nodes working in low-power transmission range
(less than100 *m*). The available data rate in such networks is expected to be between 10kbps to 50kbps. SDRT assumes that receivers can detect corrupted packets. This can be done by adding some redundant information in each packet.When a packet is totally lost or unrecoverable from corruption, this packet is treated as lost. Hence a proposed scheme is requested for efficient data transfer. A new protocol has been designed for effective data transfer.

3.NEWLY PROPOSED SCHEME

Summarizing the above discussions, we want to design a reliable data transport protocol for underwater sensor networks, with the goals of energy efficiency, high channel utilization and simple protocol management. In this paper, we propose a protocol called, Balanced Data Reliable Transport(BDRT).

Here in this newly proposed protocol only two nodes have been used for effective data transfer . Therefore energy consumption takes place. Since only two selective nodes have been used between the sender and the receiver the energy , delay time and throughput have been improved . And loss of data has been improved too . Hop-by-hop method has been used for transfer of data. Based on rooting protocol the path through which the data should be transferred is identified and after identifying the co-nodes are selected reducing the traffic . As a result the energy consumption has been reduced with respect to effective data transfer. When compared to SDRT this new protocol has more efficiency.

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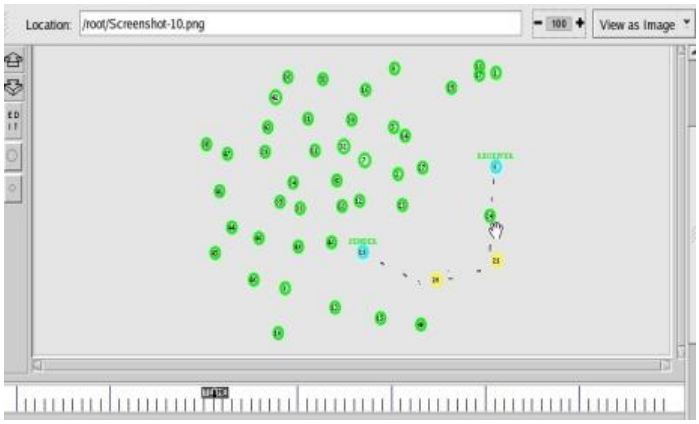

Fig.3. Proposed scheme

Here in the above diagram it has been shown that only two nodes has been used for transfer of data. And hence the desired protocol has been designed.

3.3 ALGORITHM:

- START THE PROCESS.
- BRIEFLY STUDY THE EXISTING PROTOCOL.
- USING TCL LANGUAGE DESIGN THE CODES.
- MAKE SURE THAT ROOTIN PROTOCOL IS USED FOT TRACING THE PATH.
- IMPLEMENT THE CODES IN NS2 VIA LINUX.
- CHECK FOR THE RESULTS.
- STOP.

4.PERFORMANCE RESULT:

In this section, the performance of the protocol detection is evaluated in terms of energy, delay time, an throughput.
The reason behind the selection of this measures is the performance factor.

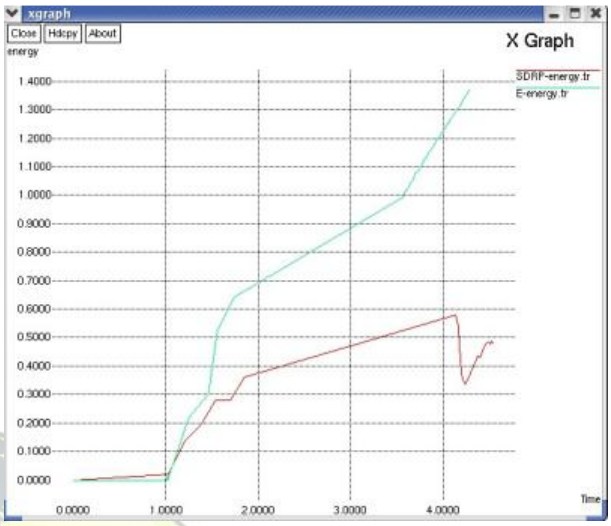

Fig.4. Energy Graph

Here in the above graph as we can see the energy evaluation where only less energy has been used to transfer the data.

Fig.5. Delay Graph

Here in the above graph it has been clearly shown that the delay time is less on its performance. This optimizes the performance level.

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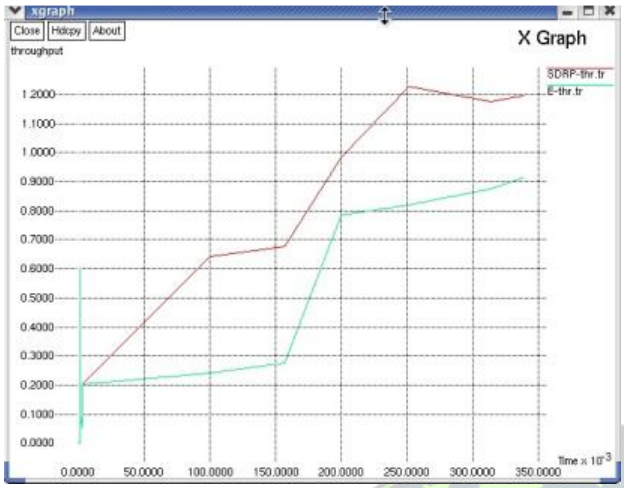

Fig.6. Throughput graph

Here in the above graph it has been clearly shown that the throughput has been efficiently improved.

5.ADVANTAGE AND DISADVANTAGE

Advantage over the existing protocol:

- The nodes between the sender and receiver has been reduced .
- Energy consumption is low.
- Delay and throughput has been generalized.
- The above factors helps the battery power to retain to its highest capacity level.

Disadvantage:

- The cost estimation for the setup may increase.
- Almost every human being involved in this process will have many works to do.

6.PARAMETERS

The proposed algorithm has been simulated in ns2 and the performance is evaluated in terms of energy ,delay time ,and throughput.

TABLE 6.1
PARAMETERS

Area	2000mx2000m
Nodes	50
Packet size	1024 bytes
Maximum speed	31 sec
Data rate	11 mbps
Max malicious node	50
Simulation time	100 sec

7. COMPARISON TABLE

The comparison table will clearly justify the over all difference between the existing and the proposed protocol model

TABLE 7.1
COMPARISON TABLE

SDRT	**BDRT**
MORE THWN 4 NODES ARE USED FOR DATA FOR DATA TRANSFER.	ONLY TWO NODES ARE USED HERE.
THE ENERGY EFFICIENCY IS LESS WHEN COMPAREDD TO BDRT.	IT HAS THE BEST ENERGY EFECIENCY.
DELAY TIME IS MORE	LESS DELAY TIME IS DETECTED.
LOSS OF DATA PACKETS TAKES PLACE	LOSS OF DATA PACKETS CANNOT BE SEEN HERE
BATTERY LIFE IS VERY LESS	IT HAS GOOD BATTERY EFFICIENCY.
MAX NODE 50	MAX NODE 50
MAX SPEED 15MBPS	MAX SPEED 11MBPS

8.CONCLUSION

The unique characteristics of underwater sensor networks pose many new challenges for reliable data transport. To address these issues, we have proposed segmented data reliable transport (SDRT) protocol. SDRT is energy efficient and

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light weight. The appropriate block size enables SDRT to address the highly dynamic network topology problem effectively. Setting appropriate block size depends on the estimation of the number of packets needed to be sent. We develop a model to estimate the number of packets actually needed for data recovery. We evaluate the the accuracy of the model and the performance of SDRT by simulations. The results show that our model accurately estimates the number of packets actually sent and SDRT has much higher energy efficiency compared with other types of approaches.

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