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IMPROVING THE PERFORMANCE OF TCP FLOWS IN WIRELESS NETWORKS BY USING EFFICIENT ALGORITHMS

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Abstract

Wireless sensor networks (WSN's) consist of spatially distributed sensor nodes that are related devoid of any wiring. Here, sensor nodes sense data from their environments and use communication units for communicating the sensed data over wireless channels. Huge variety of applications are supported in wireless sensor networks. The wireless sensor networks are used in environmental monitoring, military reconnaissance, emergency rescue operations etc.. There are many challenges available in the wireless sensor network. They are Quality of Service(QoS), fault tolerance, scalability and maintainability. Here, we choose the Quality of Service to measure the performance of Transmission Control Protocol (TCP) flows.Throughput are present in the parameter Quality of Service. There are two algorithms are used to measure the throughput. The first algorithm is TCP aware Backpressure and another one is Ad-hoc On Demand Distance Vector (AODV). Distinguish these two algorithms which one is giving a better performance of TCP flows.

Keywords: Wireless sensor networks, Quality of Service, Throughput, TCP aware Backpressure and Ad-hoc On Demand distance Vector.

1 Introduction

The most common way to communicate, the processed information is through a wireless communication. The wireless communication has established large and the communication is over a wide range. In the wireless communication, the information is sensed by the sensor called wireless sensor and the networks and protocols are used with those sensors to communicate with the devices are called the wireless sensor networks. A sensor network is composed of a large number of sensor nodes, which are thickly organized very close to it. The sensor network protocols and algorithms must attain self-organizing capabilities. Some of the purpose areas are health, military and security. One of the most significant constraints on sensor nodes is the low power consumption requirement. Sensor nodes carry limited, generally irreplaceable and power sources. Therefore, while the traditional network aims to achieve Quality of Service and sensor network protocols must hub on power conservation. Quality of Service is defined as a measure the performance of the network (Akyildiz I F et. al 2002). One important practical problem that remains open, and focus of this paper, is the performance of backpressure with Transmission Control Protocol flows. TCP is the leading transport protocol on the Internet at present and is likely to remain so for the anticipated future. Consequently, it is essential to make use of throughput enhancement potential of backpressure routing for TCP flows has proposed (Hulya Seferoglu and Eytan Modiano 2016). TCP aware Backpressure and AODV algorithms are used to determine the performance of TCP is described by (Tan K et.al 2006). In that throughput is calculated by using these two algorithms. Match up to these two algorithms which one will give better throughput.

2 Related Work

2.1 Throughput

A benchmark can be used to total throughput. In data transmission, network throughput is the amount of data stimulated successfully from individual place to another in a given time period and routinely measured in bits per second (bps), as in megabits per second (Mbps) or gigabits per second (Gbps). Throughput is a calculate of how many units of information a system can process in a given amount of time. It is applied broadly to systems ranging from various aspects of computer and network systems in organizations. Linked measures of system productivity include the speed with which some specific workload can be completed, and response time, the amount of time between a single interactive user request and delivery of the response. Answer the throughput by using TCP aware Back pressure and AODV algorithms. In that, compare these two algorithms which one gives better performance. The throughput formula can be defined as in equation (1).

$$\text{Throughput (TH)} = \text{MSS /RTT)} * (1 / \sqrt{\text{LOSS}}) \quad (1)$$

Where, MSS = Maximum Segment Size

RTT = Round Trip Time

LOSS = Probability of loss

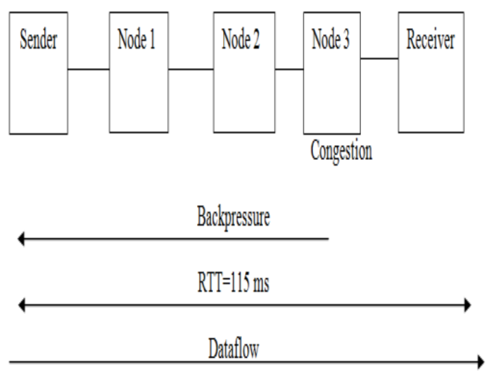
This is the formula for calculating the throughput. For example, different loss probability is taken in algorithms and finding the throughput. The Maximum segment size (MSS) is defined as the largest amount of data, specified in bytes, that TCP is eager to receive in a single segment. For best performance, the MSS should be set small enough to keep away from IP fragmentation, which can lead to packet loss and excessive retransmissions. The time taken between sender to the receiver and receiver to sender is called Round Trip Time (RTT).

3 TCP Aware Backpressure and AODV Algorithms design

3.1 TCP aware Backpressure

Backpressure routing algorithm is a method for directing opening in the region of a queueing network that achieves highest network throughput and it operates in slotted time. In particular, TCP aware Backpressure takes into describing the behavior of TCP flows and gives transmission occasion to flow with short queues. In node3 has more input data and it drops some packets in its buffer and informs node2 to slow down. The node3 is congested because it is slowing down the output of data. If node2 is congested and it informs node1 to slow down. Note that the pressure on node3 is moved backward to the source to remove the congestion described by (Moeller S et.al 2010 and Davincy Merline Sharmya A and Ida F 2015). This makes all TCP flows send out their packets, so the TCP clock, which relies on the packet transmission and end to end ACKs and continues to operate. Furthermore, the throughput of TCP flows improves by exploiting the Backpressure routing. The challenges are introduced in Backpressure such as out of order delivery, high jitter RTTs and packet losses due to corruption over wireless links described (Hulya Seferoglu and Eytan Modiano 2016), (Tassiulas L and Ephremides 1992) and (Ryu J et.al 2010). Figure 1 explains the flow diagram of TCP aware Backpressure.

Figure 1 Flow diagram of TCPaware Backpressure



The Figure 1 shows the sender sends the packet to the receiver in between the congestion is occurring and the receiver does not receive the packet. The RTT is measured in flow 2 is 115ms. For example, different loss probability is taken finding the throughput. The throughput in TCP aware Backpressure is where MSS=1460 bytes and RTT=115ms.

For the loss probability =0.6,

Throughput (TH) =(1460*8/115m) *

$(1/\sqrt{0.6})$

TH =131 kbps

3.2 Ad-hoc On Demand distance vector (AODV)

The source nodes are requested builds routes between nodes in AODV protocol. AODV is under on-demand algorithm and does not create any extra traffic for communication along links. The sources are required to the routes are maintained so long. To connect multicast group members in the form of trees. To ensure route freshness by using sequence numbers in AODV. They are self-starting and loop-free as well scaling to frequent mobile nodes.A node that receives such messages and holds a route to a preferred node sends a toward the back message through impermanent routes to the requesting node. The node that initiated the request uses the route containing the smallest amount number of hops from end to end other nodes. The entries that are not used in routing tables are cast-off after a number of time. If a link fails, the routing error is passed back to the transmitting node and the process is repeated described by (Tamizarasu K and Rajaram M 2012 and Malathi P and Chitra Devi N 2014).The networks are silent until connections are established in AODV. Network nodes that need connections broadcast a request for connection. The remaining AODV nodes forward the communication and verification the node that requested a connection. Thus, they create a series of temporary routes back to the requesting node.

Figure 2 Flow diagram of AODV

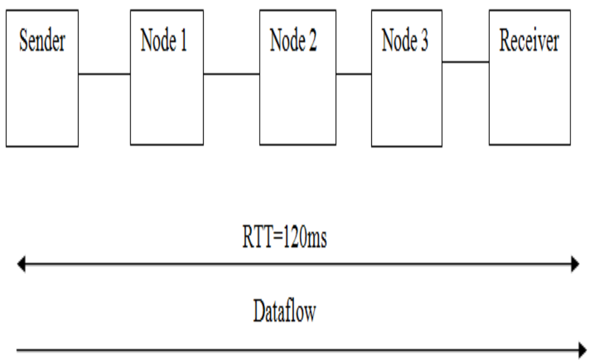


Figure 2 explains the sender sends the packets to the receiver and the receiver receive the packet and send ACKs to the sender. The measured RTT in AODV is 120ms. The throughput in AODV is where MSS=1460 bytes and RTT=120ms.

For the loss probability =0.6,

Throughput (TH) = (1460*8/120m) *

$(1/\sqrt{0.6})$

TH =125 kbps

4 Results and Discussion

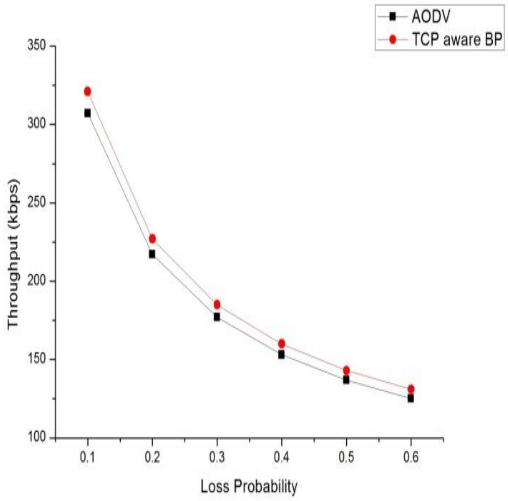
In result, we discuss the throughput in TCP aware Backpressure and AODV algorithms. TCP aware Backpressure provides high throughput as compared to AODV. The given table is discussed the throughput values of TCP aware Backpressure and AODV algorithms.

Table1. Summarizes throughput in TCP aware Backpressure and AODV

Test case	Loss Probability	Throughput (kbps)	
		AODV	TCP aware Backpressure
1	0.1	307	321
2	0.2	217	227
3	0.3	177	185
4	0.4	153	160
5	0.5	137	143
6	0.6	125	131

We consider the Table 1 and draw the graph for the relevant values in TCP aware Backpressure and AODV as in Fig. 4. In Table 1 throughput is analyzed in TCP aware Backpressure and AODV.

Figure 3 Throughput in TCP aware Backpressure



The Figure 3 shows that different loss probability are taken and finding the throughput in TCP aware Backpressure and AODV. In particular, TCP aware Backpressure improves throughput as compared to AODV by %10 for TCP flows. These results confirm the compatibility of TCP and TCP aware Backpressure.

5 Conclusions

We proposed TCP aware Backpressure routing to intense with the incompatibility of TCP and Backpressure even as exploiting the routine of Backpressure routing over wireless networks. TCP aware Backpressure improvesthe throughput of TCP as compared to AODV because of AODV is unnecessary bandwidth consumption due to periodic beaconing. TCP aware Backpressure provides the similar stability and utility-optimal operation.

References

Akyildiz I F et al 2002, ‘Computer Networks 38’, Broadband and wireless Networking Laboratory, School of Electrical and Computer Engineering, Georgia Institute of Technology,pp.393-422.

DavincyMerlineSharmya A and Ida F 2015, ‘Receiver based flow Control with backpressure Routing ’, *International Journal of advance Engineering and Research Development.*

Huaizhou SHI, Venkatesha Prasad R, Ertan onur, I.G.M.M.Niemegeers WMC,Telecommunications, Delft university of Technology. HulyaSeferoglu&Eytanmodiano2016, ‘TCP-aware backpressure routing and scheduling', on *IEEE transaction on mobile computing*, vol.15, no.7.

Malathi P and Chitra Devi N 2014, 'Performance analysis of location based Ad-hoc routing protocols DSDV and AODV' in *International Journal Scientific Research Engineering and Technology*,vol.2,no.12.

Moeller S, Sridharan A, Krishnamachari B and Gnawali O 2010, 'Routing without routes: the backpressure collection protocol',*in proc. of ACM IPSN*,Stockhalm, Sweden.

Ryu J, Bhargava V, Paine N, Shakkottai S 2010, "Backpressure routing and rate control for ICN',inproc.of*ACM Mobicom*, Chicago.

Tamizarasu K and Rajaram M 2012, 'The effective and efficient of AODV routing Protocol for minimized End -to- End Delay in MANET', *International Journal of Advanced Research in computer and communication Engineering*,vol.1,no.4.

Tan K, Song J, Zhang Q and Sridharan M 2006,'A Compound TCP approach for high speed and long distance networks', *in proc.of IEEE INFOCOM*, Barcelona,Spain.

Tassiulas L and Ephremides A 1992, 'stability properties of constrained queueing syster and scheduling policies for maximum throughput in multihop radio networks', i *IEEE Trans.onAuto.Control*, vol.37, no.12.