

Vehicle Traffic Differentiation and Scheduling in Sensor Network Using Ns2

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ABSTRACT

In this paper, the obligatory QoS administration stream parameters are characterized for every kind of activity as per now is the right time criticality and deferral affectability. The IEEE 802.15.4 is broadly utilized cutting edge standard convention as a part of numerous applications using remote sensor systems (WSNs) particularly in vehicular sensor systems (VSNs). In this paper, different planning calculations, for example, first in first out (FIFO), Priority line, Weighted Round Robin (WRR) and Deficit Weighted Round Robin (DWRR) are coordinated in consistence with IEEE 802.15.4 to enhance the throughput, upgrade the transmission capacity use rate and perform quick preparing and conveyance for dire information activity, we isolate the standard movement into different sorts of information on the premise of various QoS prerequisites. The required QoS administration stream parameters are characterized for every kind of movement as indicated by now is the ideal time criticality and postponement affectability

Keywords : *vehicular sensor network (VSN), network simulator-version 2 (NS 2) Object-oriented device around order dialect (OTcl), Class Based Queuing (CBQ), deficit counter.*

I. INTRODUCTION

Sensor networks are recently rapidly growing research area in wireless communication networks. Wireless sensors are of small size and low-cost are deployed to establish a sensor network. Vehicular networks are considered as mobile sensor networks and characterized by several basic and special characteristics such as no limited energy and storage capacity, high node mobility and fast topology changes. The vehicular sensor network can sense several types of data in its surrounding area to provide wide variety of services like traffic monitoring, crowded streets identifying, speed controlling, lost vehicle locating and environmental monitoring since it covers permanently a wide geographical area. This research aims to enhance QoS in a Vehicular Sensor Networks (VSN) by integrating traffic differentiation and scheduling mechanisms in order to reduce the end-to-end delay,

improve the throughput, enhance the bandwidth utilization rate and perform fast processing and delivery for urgent data traffic. We divide the standard traffic into various data types on the basis of different QoS requirements as the compulsory QoS service flow parameters are defined for each type of traffic. The type of data may categorize as real-time fixed data packets generation on periodic basis, real-time variable size data packets generation on periodic basis, non real-time variable size data packets and best effort.

II. CONCEPTS AND METHODOLOGY

Introduction to NS-2

System test system (Version 2), broadly known as NS2, will be essentially an event-driven Recreation device around that need demonstrated advantageous in Examining those dynamic way about correspondence networks. Recreation for wired and additionally remote system works and conventions (e. G. , directing algorithms, TCP, UDP) could be carried out utilizing NS2. Clinched alongside general, NS2 gives clients for an approach of specifying such system conventions Furthermore simulating their relating practices.

Basic Architecture of NS2

NS2 consists of two key languages: C++ and Object-oriented apparatus order dialect (OTcl). Same time the C++ characterizes those interior system (i. E. , a backend) of the reproduction objects, the OTcl sets dependent upon reenactment by amassing What's more configuring those Questions and in addition planning discrete occasions (i. E. , An frontend). The C++ and the OTcl are interfaced together utilizing TclCL. Mapped on a C++ object, variables in the OTcl domains need aid Frequently alluded with Concerning illustration handles. Conceptually, a handle (e.g., n as a Node handle) is just a string (e.g., _o10) in the OTcl domain, and does not contain any functionality. Instead, the functionality (e.g., receiving a packet) is defined in the mapped C++ object (e.g., of class Connector). OTcl

domain, a handle demonstrations Similarly as An frontend which interacts with clients What's more other OTcl Questions. It characterizes its identity or methods What's more variables should encourage the interactional. Note that the part methods and variables in the OTcl space are known as example methods (instprocs) and instance variables (instvars), respectively. Before proceeding further, the readers are encouraged to learn C++ and OTcl languages.

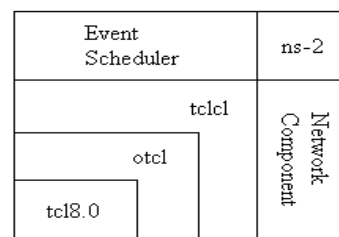


Fig 1. Basic Architecture of NS2

NS2 output is either text-based or animation-based simulation result or both. To analyze a particular behavior of the network, users can extract a relevant subset of text-based data and transform it to a more conceivable presentation.

TCL Commands

The behavior of the Tcl command processor can be summarized in three basic steps:

- Argument grouping.
- Value substitution of nested commands, variables, and backslash escapes.
- Command invocation. It is up to the command to interpret its arguments.

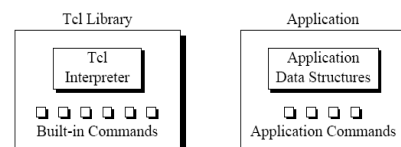


Fig 2. To create a new application in TCl

The router is the shared resource in the network. Many of the problems that arise in the network are related to

allocation of a limited amount of shared resources to the service classes.

III. FIFO- (FIRST IN FIRST OUT)

First In First Out is the most basic queue scheduling discipline. All packets are treated equally by placing them in a single queue and then servicing them in the same order in which they arrive. They also referred to as First Come First Serve Scheduling. The Thought about fifo queuing will be that those Initially bundle that lands In a switch may be those Initially bundle should be transmitted. Provided for that the measure for cushion space during every switch is finite, if a bundle lands and the queue (buffer space) is full, after that the switch discards (drops) that bundle. This will be carried out without respect to which stream the bundle belongs should alternately how vital the bundle may be.

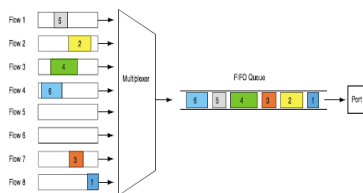


Fig 3. - FIFO Queue

Priority Queuing (PQ)

Priority Queuing is the basis for all queue scheduling algorithms that are designed to provide a relatively simple method of supporting differentiated service classes. In classic PQ, packets are classified by the system and then placed into different priority queues. Packets are scheduled from the head of a given queue only if all queues of higher priority are empty. Within each of the priority queue, packets are scheduled in FIFO.

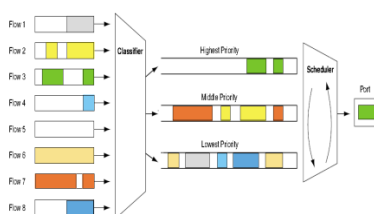


Fig 4 . Priority Queuing

Weighted Round Robin (WRR)

Weighted Round Robin (WRR) is the foundation of the class of queue scheduling discipline. In WRR, packets are first classified into various service classes and then assigned to a queue that is especially dedicated to that service class. Each of the queues is serviced in a round robin manner. Weighted Round Robin is also referred to as Class Based Queuing (CBQ) or custom queuing.

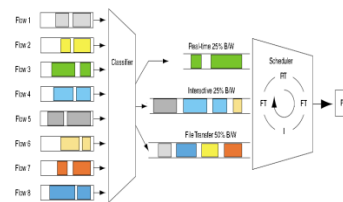


Fig 5. Weighted Round Robin

Deficit Weighted Round Robin (DWRR)

In classic DWRR algorithm, the scheduler visits each non-empty queue and determines the number of bytes in the packet at the head of the queue. The variable Deficit Counter is incremented by the value quantum. If the size of the packet at the head of the queue is greater than the variable Deficit Counter, then the scheduler moves onto service the next queue.

In DWRR queuing, each queue is configured with the number of parameters.

A weight that defines the percentage of the output port bandwidth allocated to the queue.

A Deficit Counter that defines the total number of bytes that a queue is permitted to transmit each time that is visited by the scheduler. The Deficit Counter allows a queue that was not allowed to transmit in the previous round.

- A quantum of service that is proportional to the weight of the queue and is expressed in terms of bytes. The Deficit Counter of the queue is incremented by the quantum that a service is visited by the scheduler. If $quantum[i] = 2 * quantum[x]$, then queue I will

receive twice the bandwidth as queue x when both queues are active.

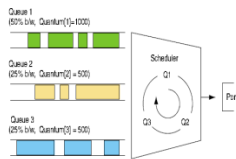


Fig 6. Deficit Weighted Round Robin

IV. RESULT AND DISCUSSION

For wireless sensor networks (WSNs), IEEE 802.15.4 is used as de-facto standard. However, the behaviour of CSMA/CA, collision at heavy load, reduces the throughput and energy consumption performance of WSN.

Traffic Differentiation in VSN

For supporting Quality-of-Service (QoS) in VSNs consists of including differentiation mechanism in the MAC layer, since several types of events with different significance and severity may happen in the roads. Moreover,

other non-related road traffic is to be supported by the sensor network such as pollution control, urban application etc. The differentiation mechanism will not retransmit packets as they arrive but it consists of:

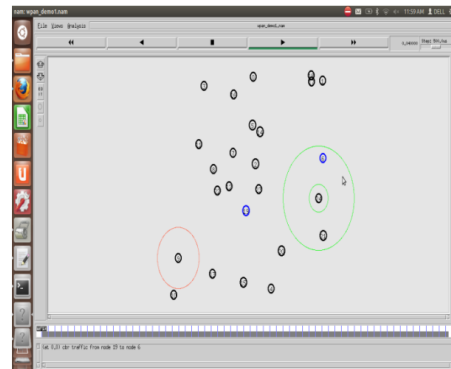
- Collecting and classifying data from cars and other neighbour platforms,
- Marking and storing data in different queues characterized with different priority levels.

Scheduling in VSN

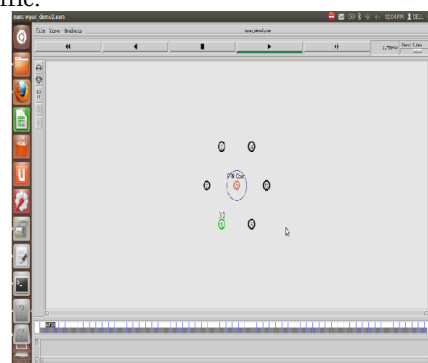
The scheduling in VSN is achieved and tested using the queuing methods such as FIFO, priority queue, WRR, DWRR.

SIMULATION RESULTS

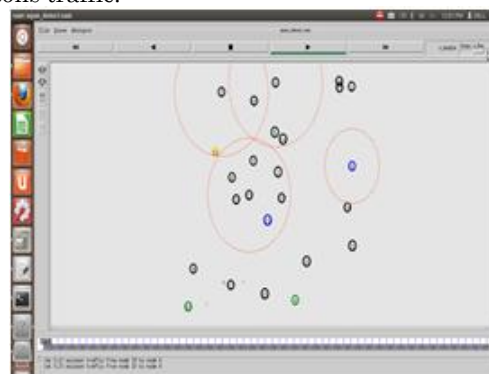
A). 802.15.4 nodes using AODV routing protocol and FTP traffic.



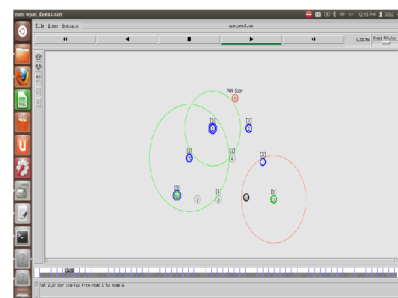
B). 802.15.4 nodes using AODV routing protocol and CBR traffic.



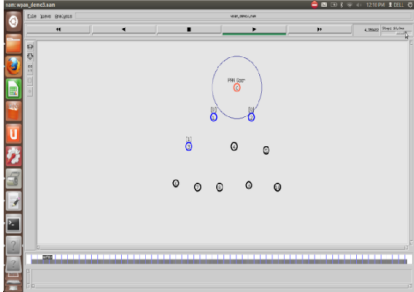
C). 802.15.4 nodes using AODV routing protocol and poisons traffic.



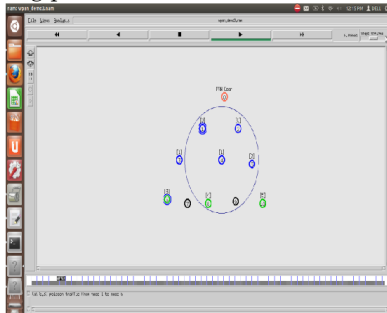
D). 802.15.4 nodes star topology (beacon enabled) using AODV routing protocol and FTP traffic.



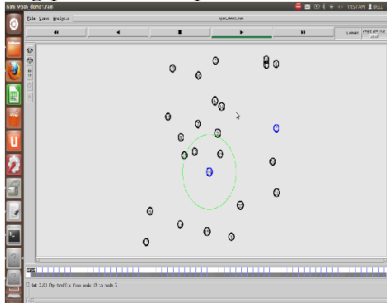
E). 802.15.4 nodes tree topology (beacon enabled) using AODV routing protocol and FTP traffic.



F). 802.15.4 nodes tree topology (beacon enabled) using AODV routing protocol and CBR traffic.



G). 802.15.4 nodes tree topology (beacon enabled) using AODV routing protocol and poisons traffic



V. CONCLUSION

In this paper Traffic differentiator has been designed for different services like traffic monitoring, crowded streets identifying using the coding methodology by FIFO (first in first out), priority queue, WRR (WEIGHTED ROUND ROBIN), DWRR (DEFICIT WEIGHTED ROUND ROBIN). The literature survey on topic WSN, VANET and network simulators have been analyzed by the queuing methods in 802.1514.simulations of star, tree topology using CBR,

FTP, and poisons traffic are simulated. The results of scheduling algorithm have been compared to reduce end-end delay, increased bandwidth, throughput to perform fast processing and delivery for urgent data traffic.

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