SRS for JAVA Network Simulator

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1 Introduction

1.1 Purpose of this document

This document is to define the requirements for designing a Java network simpulator(JNS). It specifies the guidelines for developing such a system. The document serves to set the proper boundary lines that are needed to be covered for the system.

1.2 Scope of this document

The system is being developed by the students of the CSE dept, IIT Bombay. The document is being developed to serve the requirements of the system under a course lab.

1.3 Overview

JNS system is a very basic network simulator build on a purpose of guiding students, so as to visualize the events taking place within a networking environment. It can also be used for virtual testing before realization of some small scale networks.

2 General Description

Allows developers of networking protocols to simulate their protocols in a controlled environment Produces a trace file which can be viewed in a network animator program JNS Network Building Blocks :

1. Nodes
2. Interfaces
3. Links

A brief description of these are explained below:

1. JNS Node
    - Components
        - Zero or more interfaces
        - One IP Handler object
        - A name
    - Functionality
        - Attaching interfaces
        - Sending and Recieving packets
        - Recording timestamps
2. JNS Interface
    - Components
        - IP Address
        - Bandwidth
        - Queue
    - Functionality
        - Attaching a link
        - Attaching a queue
        - Transferring packets
    - Types
        - Simplex Interface
        - Duplex Interface
        - Half Duplex Interface

3. Links

    - Characteristics
        - Bandwidth
        - Propagation delay
        - An error rate
    - Types
        - Simplex Link
        - Duplex Link
        - Half Duplex Interface

3 Functional Requirements

This section lists the functional requirements in ranked order. Functional requirements describes the possible effects of a software system, in other words, what the system must accomplish.

3.1 Description with technical requirements

The system is intended to simulate the network environment among various nodes using UDP/TCP protocol. User has to specify the network parameters in terms of number of nodes, links among them, types of connections (simplex, duplex, etc) and various operating speeds of these elements. It also serves to provide post simulation statistics through trace or log files for analysis. These files will show the events occured during simulation along with their time-stamps, source and destination of the packets. It is also intended to show the packet loss due to collision during the simulation process. After collision exponential back off method will also be supported, so as to decrease the probability of collision.

3.2 Cost and schedule

The overall duration for the system to be prepared spans over two months, through the semester. As it is just for learning purpose so no costs are involved.

4 Interface Requirements

This section describes how the software interfaces with the user.

4.1 User Interfaces

The system interacts with the user by accepting network parameters in a structured input file. The format of this input file is predefined. Thus, the network needs to written in text form, which serves as the input. Output is in two forms - GUI and trace files.

4.1.1 GUI

The course of simulation process is needed to be shown in graphical format. The given specifications of the network will be converted into the graphical form. Also, it shows transmission and recieving of packets, collision and loss of packets.

4.1.2 CLI

The results which specifies the events occured during the simulation will be stored into some trace file. It shows the timestamps of sending and recieving of packets from one node to another.

5 Conclusion

JNS hepls in testing a proposed network system in an specified area, so as to find the feasibility of its implementation. It can also serve as a useful guide for students who are new to this field. It provides the statistics of the operation of the network without physical realization.[1][2][3]

References

[1] Network Simulator 2.

[2] cnet network simulator.

[3] C.S. McDonald. A network specification language and execution environment for undergraduate teaching. *Proc. of the ACM Computer Science Education Technical Symposium '91, San Antonio, Texas*, pages 25–34, March 1991.