

Design and Development of a Graphical User Interface for Network Simulator NS2



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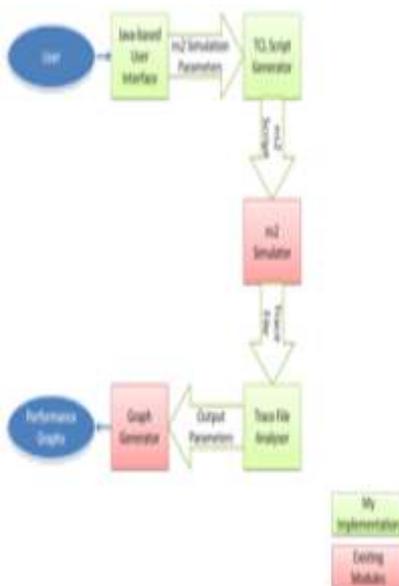
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Abstract:

NS2 is an open source discrete event network simulator used extensively in academia for Mobile Ad-hoc Network (MANET) routing protocol evaluation. Typically, MANET routing protocol evaluation involves writing a large number of TCL scripts, with minor modifications, and simulating them. The outputs are generally analysed in terms of throughput, latency and PDR (Packet Delivery Ratio) for some variable parameters. This process is time consuming because of the largely repetitive steps involved and complicated because of the AWK scripts needed to extract relevant information from the trace files.

This project deals with the design and development a GUI front-end for NS2 that is customized for creation of simulation scripts, simulation and performance evaluation of MANET routing protocols. The first tab of the GUI asks the user to enter scenario-common parameters such as simulation time, number of nodes, node placement details and routing protocol. The second tab, called the Visualisation tab, displays the positions of the nodes depending on the node placement entered in tab 1. The next tab asks the user for details regarding the number of TCP and/or UDP flows and their respective sources and sinks. The last tab deals with the application layer details for each TCP or UDP flow identified previously. The last tab also incorporates logic for generating the TCL scripts, running ns with appropriate arguments and display outputs. Appropriate AWK scripts have been developed to calculate throughput, PDR and latency for each flow.

The developed GUI was functionally verified by providing large set of values for all the parameters. The generated TCL script was verified against a hand written script for the same scenario and the scripts were found to be identical, except for minor cosmetic differences. The GUI was able to run the TCL script using the ns command. The output trace file was also similar to that generated by running the hand written script. The AWK scripts were also found to be executing correctly and displaying accurate readings of throughput, latency and PDR for each flow. Areas of future work to look into would be the integration of a drag and drop mechanism with this GUI, as well as graph-based rendering of outputs.



Flow of the work carried out



Visualisation tab



Flow information tab