QoSMon: A Quality of Service Monitoring System for Low Resource Networks

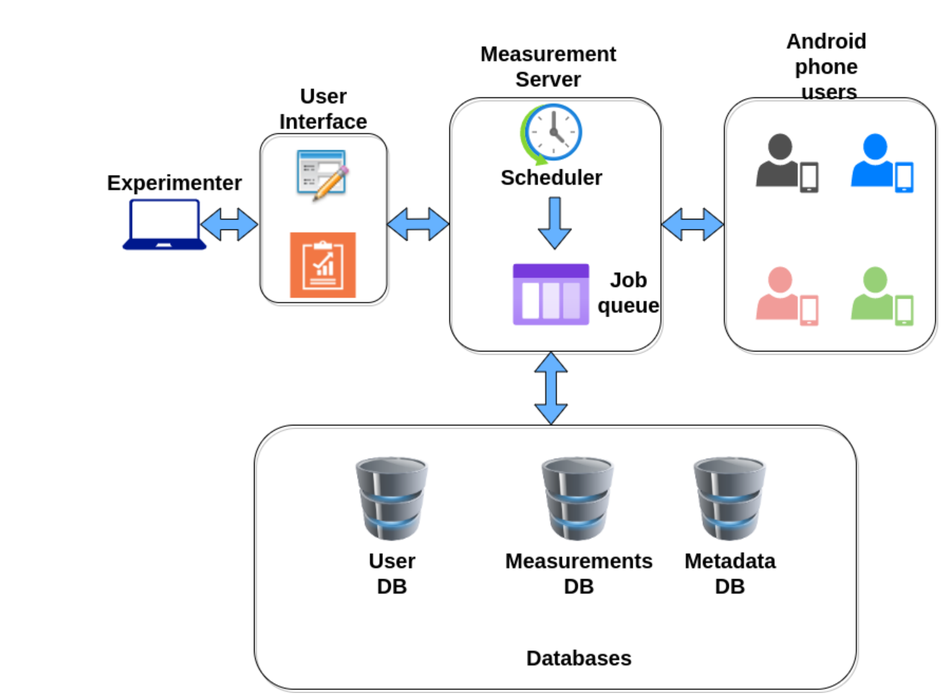
Project Description

The design and implementation of computer networks using limited hardware and software resources has been studied extensively in the past, but scheduling strategies for conducting measurements on these networks remains an important area to be explored. In this study, the design of a Quality of Service monitoring system is proposed, focusing on performance of scheduling of network measurement jobs in different topologies of a low-resource network, such as a community network.

Motivation

- High proportion of wireless/unstable links in community networks ⇒ smartphones a popular mode of internet access
- Bias in active measurements due to probing packets - the observer effect
- Need for appropriate measurement scheduling

Proposed Solution



Network topologies were generated using a conflict probability and evaluation was performed using 4 Android phones with each scheduling algorithm running for 2 hours in the measurement server.

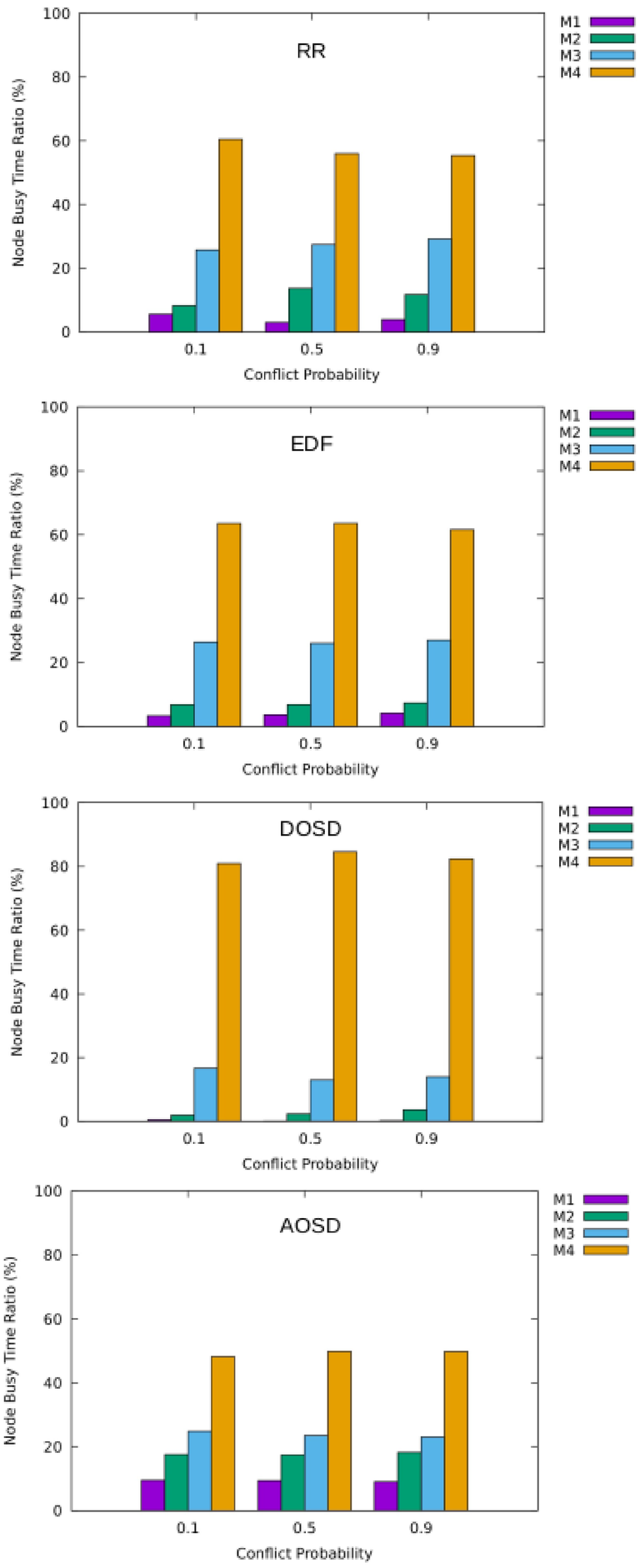
Results

To measure the distribution of jobs among nodes, we calculate the node busy time ratio for each algorithm.

$$NBTR_i = \frac{e_i}{\sum_{i=1}^{m} e_i} \times 100 \quad (1)$$

where e_i denotes the execution time in milliseconds of all job instances in measurement node M_i in a single iteration.

AOSD algorithm achieves the least node busy time ratio among all algorithms.



Future Work

- Full virtualization of network topology using mininet
- Support for on-demand measurements
- Integration testing with iNethi services

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