SCHEDULING AS AN OPTIMIZATION PROBLEM

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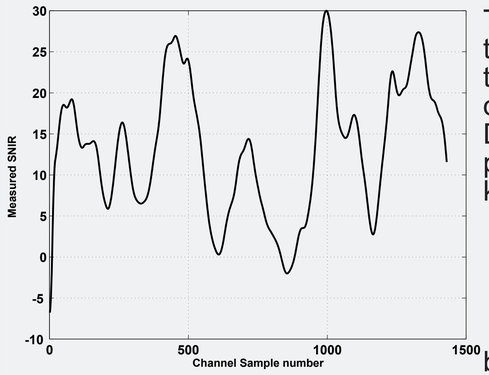
TCP/IP and Fading



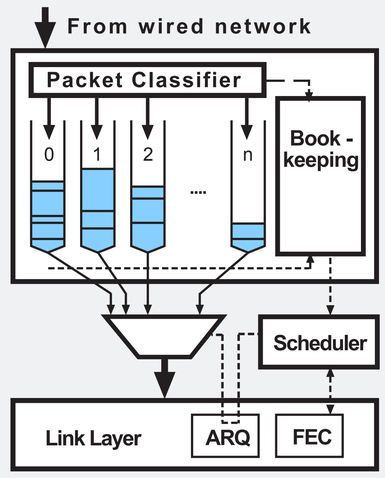
The varying channel quality leads to errors on transmitted data, that in turn affect negatively on the TCP performance. Different channels fade independently, so a mechanism that knows about the fading could:

Give higher spectral efficiency

Give different QoS to users

by allocating time slots when conditins are favourable.

Buffers and a Scheduler



Arranging the traffic flows into different queues, and letting a scheduler handle the draining of the queues, based on

Predicted channel quality

Priority of the traffic flow

could be a solution for such a mechanism.

In this paper we address the performance of the scheduler

3 scheduling algorithms have been implemented and compared

Best First

For each time-slot, give it to the user that:

1 is in shortage

2 has the highest predicted throughput

Robin Hood

1st round:
Give each time-slot to the user that:
has the highest predicted throughput

2nd round:
Re-distribute by ~~taking from the~~ rich (over-allocated), and ~~giving to the~~ poor, until either no more rich or no more poor users remain.

Controled Steepest Descent

1st round:
Give each time-slot to the user that:
has the highest predicted throughput

2nd round:
Maximize user satisfaction by reducing the difference between allocated and desired resources in a steepest descent fashion.

Wish to find the performance of the different scheduling algorithms in terms of

Resulting throughput

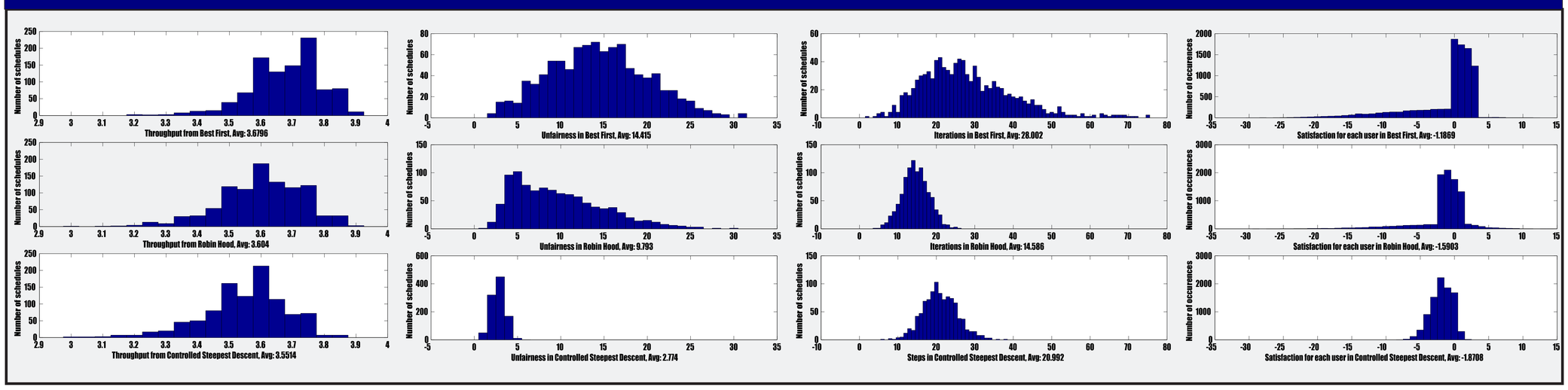
Schedule fairness

Computational delay

The transmission simulations have been omitted to save time (no BER)

The traffic demand is slightly higher than the provided throughput

Simulation results



Conclusions

Provision of fairness seems to be done at the cost of reduced throughput

Fairness is also given at the cost of higher computational complexity, at least when only taking these three algorithms into account

Further work, plans

An analytical solution to the Lagrange formulation given in the paper would be interesting to investigate.

Moreover, a complete testbed to measure the effects of fading, scheduling, and TCP enhancements on real TCP traffic will be developed within the WIP project.