Independent Project Work

Independent project work

- Corresponding to at least 60 hours per person
- Groups of 1, 2 or 3 student allowed
- Theoretical work (ca 10 pg)
- Practical work (ca 3 pg)
- Possible to combine with Wireless course
- Course grading will be done on this work

Evaluation of live 3G performance

- Practical / Measurements
- Measure and report the bandwidth that can be reached for a 3G data card in different locations and for different signal strength.
- Also measure the delays and delay variation.
- Might require the cooperation of a 3G provider

KauNet performance evaluation

- Practical / Measurement on emulator
- KauNet is a network emulation platform that has been developed at KaU and used in research.
- This work comprises in doing experiments to determine the maximum throughput that KauNet can sustain or regular PCs. Parameters that vary will be and delay clock interrupt rate, packet size, emulator settings.
- Experiments are to be performed and presented.

NPBox performance evaluation

- Practical / Measurement on emulator
- NPBox is a programmable network emulator developed at KaU and ENSICA in Toulouse.
- This work comprises in doing experiments to determine the maximum throughput that NPBox can sustain or regular PCs. Parameters that vary will be and delay clock interrupt rate, packet size, emulator settings.
- Experiments are to be performed and presented.

Effectiveness evalutation of NTFS

- Practical / Measurements
- File size vs cluster slack examination
- For a future EU research project on computer forensics
- Possible continuation as Masters work.

Create a queuing theory toolbox for octave.

- Practical / Tool development
- Develop and document octave functions for M/M/1, M/M/c, M/M/1/k and other systems.

KaU WLAN coverage planning validation

- Practical / Measurements
- Kau Has used a coverage simulation tool provided by Cisco to plan the deployment of new access points. This simulator predicts the SNR as a function of access point placement and building layout.
- The work here comprises to do real measurements of the SNR of deployed access points and comparing that to the values predicted by the simulation.
- This will help future acces point planning and VoIP over WLAN deployment.

Do a survey of analytical TCP models.

- Theoretical
- Make a survey and summary of different analytical TCP models. Padhye, fluid flow, markov-chains …

Evaluate Early Retransmit for TCP

- For this project you should evaluate the performance enhancement given by the Early Retransmit (ER) extension to TCP, in ns2. ER is an extension that is particularly useful for short TCP transfers, such as web flows. You can read more about ER, and why it is beneficial for short flows, at: http://www.icir.org/mallman/papers/draft-allman-tcp-early-rexmt-06.txt
- You should implement the byte-based version of the algorithm in one of ns2's TCP Agents, and test it on web-like traffic.
- Some of the objectives of this project could be:
  - Determine how much improvement ER gives for different levels of packet loss.
  - Is the improvement statistically significant?

Head-of-line blocking

- Practical / Emulation
- TCP has strict order-of- transmission delivery of data.
- The strict order-of-transmission can block the delivery of data when packet loss occurs.
- For example, if three packets are sent from a TCP sender and the first of these are lost, the receiving TCP will not deliver the two following packets to the application before the retransmission of the third is received. This is called head-of-line blocking (HoLB).
- Using KauNet, determine how much the problem of HoLB affects the performance of TCP.
- Use different bandwidths, end-to-end delays, packet loss rates, and also traffic patterns (long/short flows).

TCP Version

- Practical / Simulation
- TCP has undergone significant improvements during its lifetime.
- In ns2 there exists a number of different TCP Agents (e.g. TCPReno, TCPNewReno, TCPSack).Determine the difference in performance between three, or more, of these versions using ns2.
- Evaluate the protocols for some different scenarios, e.g. different packet loss rates, bandwidths, traffic patterns.
- By studying your results, what features of the different versions gives this performance enhancement?

TCP Options

- Practical / Simulation
- TCP has a number of different options that can be turned on/off. All options have been developed to enhance some aspect of TCP.
- Determine which TCP options that are available in ns2, and evaluate a subset of them.
- Do they give significant enhancements? Be sure to evaluate the options in a representative manner, i.e. evaluate them against the scenario they were designed for.

TCP vs SCTP

- Practical / Simulation
- SCTP is a protocol that is similar to TCP, but includes some features to better support telephony signaling in IP-networks.
- Determine if there are any performance differences between these protocols.
- Using ns2 with appropriate parameterization (e.g. bandwidths, packet loss rates).