



Cross-layer optimisation of wireless networks (CLOWN)

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CLOWN: Outline

- Project duration 1.5.2006-31.8.2008
- Funded by Tekes
- Project goals:
 - Expand the understanding of cross-layer optimization in wireless networks
 - Apply the flow-level modeling approach to the context
 - Provide algorithmic solution methods to the problems



CLOWN: Personnel

- Project manager: Prof. Jorma Virtamo
- Researchers:
 - Aleksi Penttinen (25 mm)
 - Riikka Susitaival (2 mm)
- Management Committee:
 - Kari Aaltonen (Nokia Siemens Networks)
 - Jorma Julku (Tekes)
 - Risto Määttä (Finnish Defence Forces Technical Research Centre)
 - Jorma Virtamo (TKK)



Collaboration

- Co-operation with other projects in the department (ABI, Fancy)
- Collaboration on scheduling problems with Helsinki Institute of Information Technology HIIT
- International collaboration within COST 290 action Traffic and QoS Management in Wireless Multimedia Networks



Results

- Results published as scientific articles
 - 4 journal articles
 - 6 conference articles
- A state-of-the-art document on mesh networks (jointly with ABI)
- Contribution to the COST 290 final report (to be published by Springer)
- Practical algorithms and methods for performance analysis and dimensioning of wireless data networks



Publications

1. P. Kaski, A. Penttinen and J. Suomela, Coordinating Concurrent Transmissions: A Constant-Factor Approximation of Maximum Weight Independent Set in Local Conflict Graphs, *Ad Hoc & Sensor Wireless Networks: An International Journal*, 2008, to appear
2. J. Leino, A. Penttinen and J. Virtamo, Flow-optimized random access for wireless multihop networks, *Performance Evaluation*, 2008, to appear
3. P. Lassila, A. Penttinen and J. Virtamo, Dimensioning of data networks: a flow-level perspective, *European Transactions on Telecommunications*, 2008, to appear
4. A. Penttinen, Computation of fair flow rates in data networks, *IEEE Communications Letters*, vol. 12, no. 1, pp. 53-55, 2008
5. J. Leino, A. Penttinen and J. Virtamo, Flow-optimized random access for wireless multihop networks, in *Proceedings of ACM MSWiM 2007*, pp. 387-394, 2007, Chania, Crete Island
6. R. Susitaival, Load Balancing by Joint Optimization of Routing and Scheduling in Wireless Mesh Networks, in *Proceedings of ITC-20*, 2007
7. P. Kaski, A. Penttinen and J. Suomela, Coordinating Concurrent Transmissions: A Constant-Factor Approximation of Maximum Weight Independent Set in Local Conflict Graphs, in *Proceedings of the 6th International Conference on AD-HOC Networks & Wireless, AdHoc-Now 2007*, Lecture Notes in Computer Science, Volume 4686/2007, pp. 74-86, 2007
8. J. Leino, A. Penttinen and J. Virtamo, Approximating Flow Throughput in Complex Data Networks, in *Proceedings of 20th International Teletraffic Congress (ITC-20)*, pp. 422-433, 2007, Ottawa, Canada
9. P. Lassila, A. Penttinen and J. Virtamo, Dimensioning methods for data networks with flow-level QoS requirements, in *Proceedings of 32nd IEEE Conference on Local Computer Networks (LCN)*, pp. 353-359, 2007, Dublin, Ireland
10. P. Lassila, A. Penttinen and J. Virtamo, Dimensioning of wireless mesh networks with flow-level QoS requirements, in *The 3rd ACM International Workshop on Performance Evaluation of Wireless Ad Hoc, Sensor, and Ubiquitous Networks 2006*
11. T. Huovila, P. Lassila, J. Manner and A. Penttinen, *State of the Art Analysis of Wireless Mesh Technologies 2006*, Helsinki University of Technology, 2006