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To: Ing. Marie Duchoslavová
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Subject: Dissertation thesis review

The dissertation thesis written by Petr Jurcik deals with an interesting and up-to-date topic. In my personal opinion, the original research contributions of ing. Petr Jurcik are sound and interesting. In particular, I appreciate very much the part relevant to the dimensioning and worst-case analysis of cluster tree networks (Sect.5).

I have just a few observations for the candidate.

1. I do agree on the suitability of the IEEE 802.15.4 cluster-tree topology to support time-bounded flows. However, if the target is implementing large-scale real-time WSNs, some issues such as scalability and unbalanced energy consumption should be discussed. The work [1] addressed these issues providing simulation results obtained using the OMNeT++ tool. Some insight on these topics would be worth of being discussed by the candidate.

2. Just for the sake of clarity and for the reader's benefit, the reason for not choosing OMNeT++, which is an open source project quite popular in academic contexts, should be explained. The choice of the Opnet modeler, i.e., a commercial product with a time-limited free licence for students, has to be properly motivated.

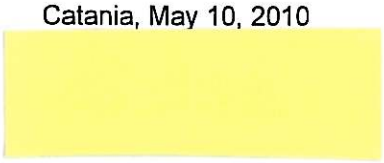
3. In Sect.4 the candidate addresses Time Division Cluster Scheduling (TDCS) in an adequate way, building on previous work from a research group he has ben working with. In addition to this, the candidate could reference to a novel technique for collision-free superframe scheduling in cluster-tree IEEE 802.15.4/ZigBee networks recently proposed in [2]. This work presents a novel scheduling algorithm, called a Multichannel Superframe Scheduling (MSS), which exploits multiple radio channels to allow contention-free scheduling of sets of superframes that could not be schedulable under single-channel superframe scheduling algorithms such as the one in [3], as the sum of their duty cycles exceeds one.
The candidate might want to have a look on the paper and refer to it in Sect.4.2.

Summarising, my judgement is positive. I really enjoyed reading the thesis and I recommend a positive outcome of the doctoral thesis defence.

References
[1] E. Toscano, L. Lo Bello, "On the Use of IEEE 802.15.4 for Real-Time Wireless Sensor Networks", in Proceedings of the 7th International Workshop on Real-Time Networks, RTN'08, Prague, Czech Republic, 2008, pages 47-52.
[2]E. Toscano, L. Lo Bello, "A Multichannel Approach to Avoid Beacon Collisions in IEEE 802.15.4 Cluster-Tree Industrial Networks", In Proceedings of the 14th IEEE International Conference on Emerging Technologies and Factory Automation, ETFA'09, Sept.22-26, 2009, Palma de Mallorca, Spain, ISBN 978-1-4244-2728-4,ISSN 1946-0759.

[3]A. Koubâa, A. Cunha, M. Alves, e E. Tovar, "TDBS: a time division beacon scheduling mechanism for ZigBee cluster-tree wireless sensor networks," Real-Time Systems, vol. 40, Dic. 2008, pp. 321-354.

Catania, May 10, 2010



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