

## **WSN Communication and Flooding Protocols**

**Week 9 Wednesday 23 September 2009**

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### **Objectives**

On completing this topic, students will be able to describe some common types of errors in sensor network communications; to explain the operation of a basic flooding protocol; to define the broadcast storm problem; and to be able to evaluate and discuss variations on the flooding algorithm that reduce broadcast storm effects.

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### **Recommended Reading**

#### **Core Paper**

[NTCS99] Sze-Yao Ni, Yu-Chee Tseng, Yuh-Shyan Chen, and Jang-Ping Sheu. The broadcast storm problem in a mobile ad hoc network. In *Proceedings of the Fifth Annual ACM/IEEE International Conference on Mobile Computing and Networking (MobiCom'99)*, Seattle, WA, 1999.

#### **Further Reading**

[ABB+04] Daniel Aguayo, John Bicket, Sanjit Biswas, Glenn Judd, and Robert Morris. Link-level measurements from an 802.11b mesh network. In *SIGCOMM '04: Proceedings of the 2004 conference on Applications, technologies, architectures, and protocols for computer communications*, pages 121–132. ACM Press, 2004.

[DCO04] Patrick Downey and Rachel Cardell-Oliver. Evaluating the impact of limited resource on the performance of flooding in wireless sensor networks. In *International Conference on Dependable Systems and Networks, Florence July 2004*, 2004.

[Cro05] Crossbow. Mica Motes Specifications, 2005. "[Online] [www.xbow.com/Products/Wireless Sensor Networks.htm](http://www.xbow.com/Products/Wireless%20Sensor%20Networks.htm)"

[Dij74] Edsger W. Dijkstra. Self-stabilizing systems in spite of distributed control. *Communications of the ACM*, 17(11), 1974.

[Fal04] Alessio Falchi. Sensor networks: Performance measurements with motes technology. Master's thesis, Dept. of Information Engineering, University of Pisa, 2004.

[GKW+03] D Ganesan, B Krishnamachari, A Woo, D Culler, D Estrin, and S Wicker. An Empirical Study of Epidemic Algorithms in Large Scale Multihop Wireless Networks, 2003. Technical Report CSD-TR02-0013, UCLA.

[KNG+04] David Kotz, Calvin Newport, Robert S. Gray, Jason Liu, Yougu Yuan, and Chip Elliott. Experimental evaluation of wireless simulation assumptions. In *Proceedings of the 7th ACM international symposium on Modeling, analysis and simulation of wireless and mobile systems*, pages 78-82. ACM Press, 2004.

[SCS03] Yoav Sasson, David Cavin, and Andre Schiper. Probabilistic broadcast for flooding in wireless mobile ad hoc networks. In *Proceedings of IEEE Wireless Communications and Networking Conference (WCNC 2003)*, 2003.

[WWC03] Alec Woo, Terrence Wong, and David Culler. Taming the Underlying Challenges of Reliable Multihop Routing in Sensor Networks. In *Proc. Second ACM International Workshop on Wireless Sensor Networks and Applications*, 2003.

[XGB03] Kaixin Xu, Mario Gerla, and Sang Bae. Effectiveness of RTS/CTS Handshake in IEEE 802.11 Based Ad Hoc Networks. *Ad Hoc Networks Journal*, pages 107--123, July 2003.

[ZG03] Jerry Zhao and Ramesh Govindan. Understanding packet delivery performance in dense wireless sensor networks. In *Proceedings of the 1st international conference on Embedded networked sensor systems*, pages 1--13. ACM Press, 2003.