Simulations of Energy-Harvesting Wireless Sensor Networks with GreenCastalia

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Energy Consumption Modeling and Simulation Discussion Panel

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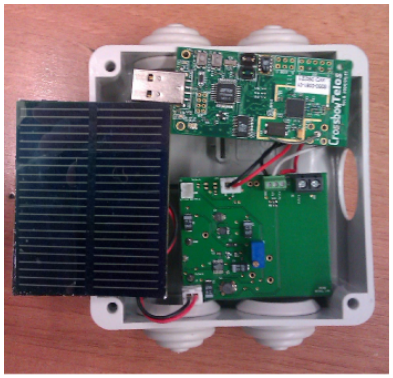
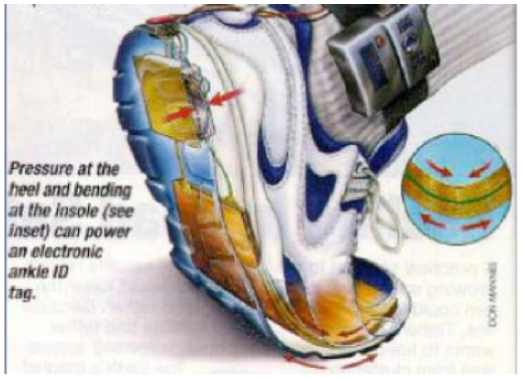
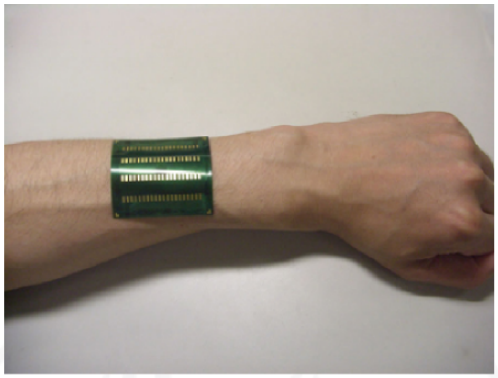
Energy Harvesting Wireless Sensor Nodes

Motes (partially) powered by environmental energy







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- Virtually unlimited lifetime to WSNs
- Uncertain energy availability requires protocols re-design
- Need for simulation frameworks to support design and evaluation of harvesting-aware protocols

Castalia model for OMNET++

- Simulations of distributed algorithms for WSNs
- Radio model: state-based energy consumption, accounts for delay/power of state transitions
- Simple ideal battery model, no support for energy harvesting

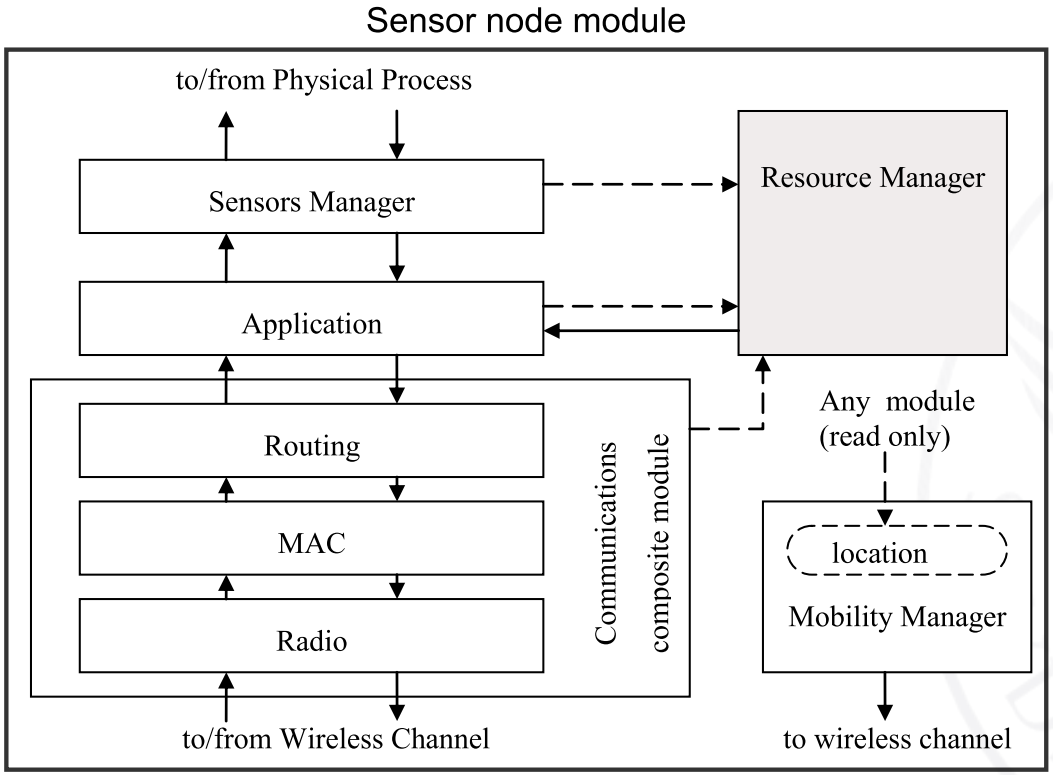

Image credit: Castalia User Manual

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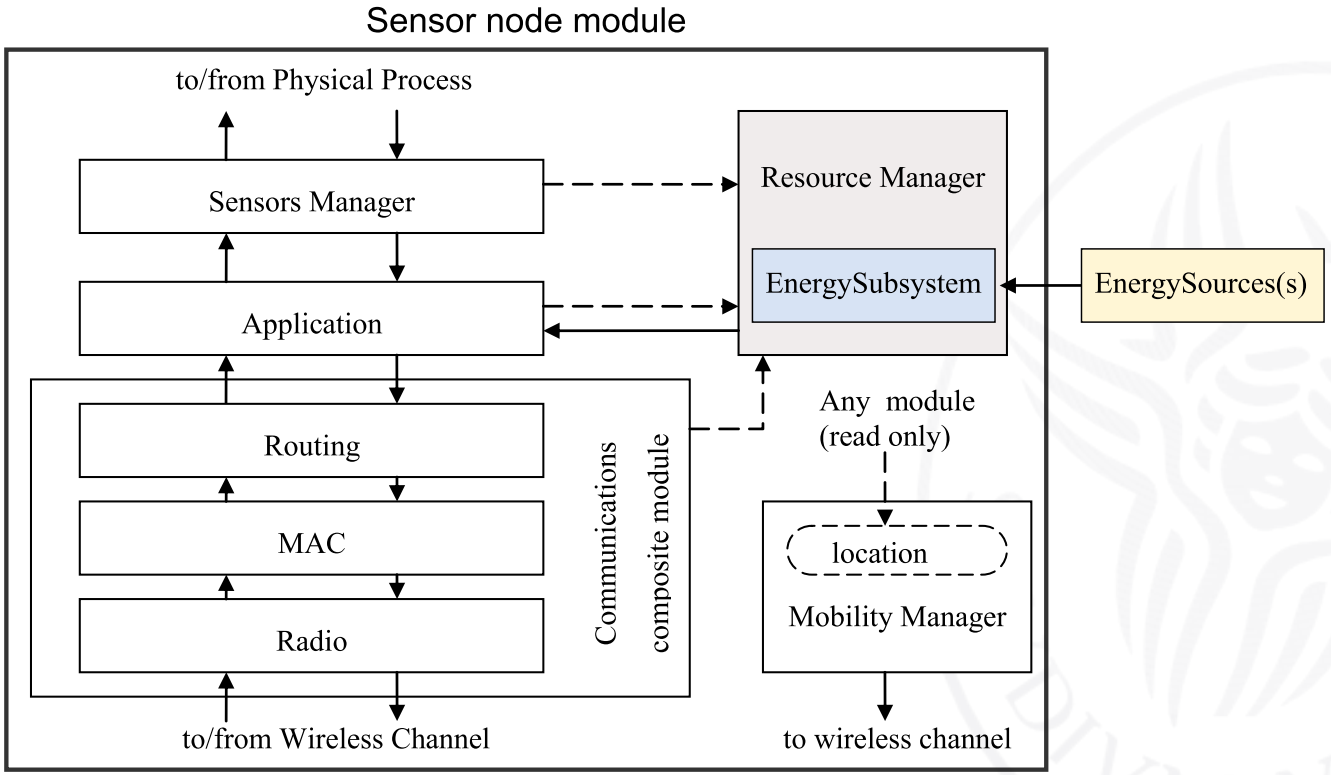

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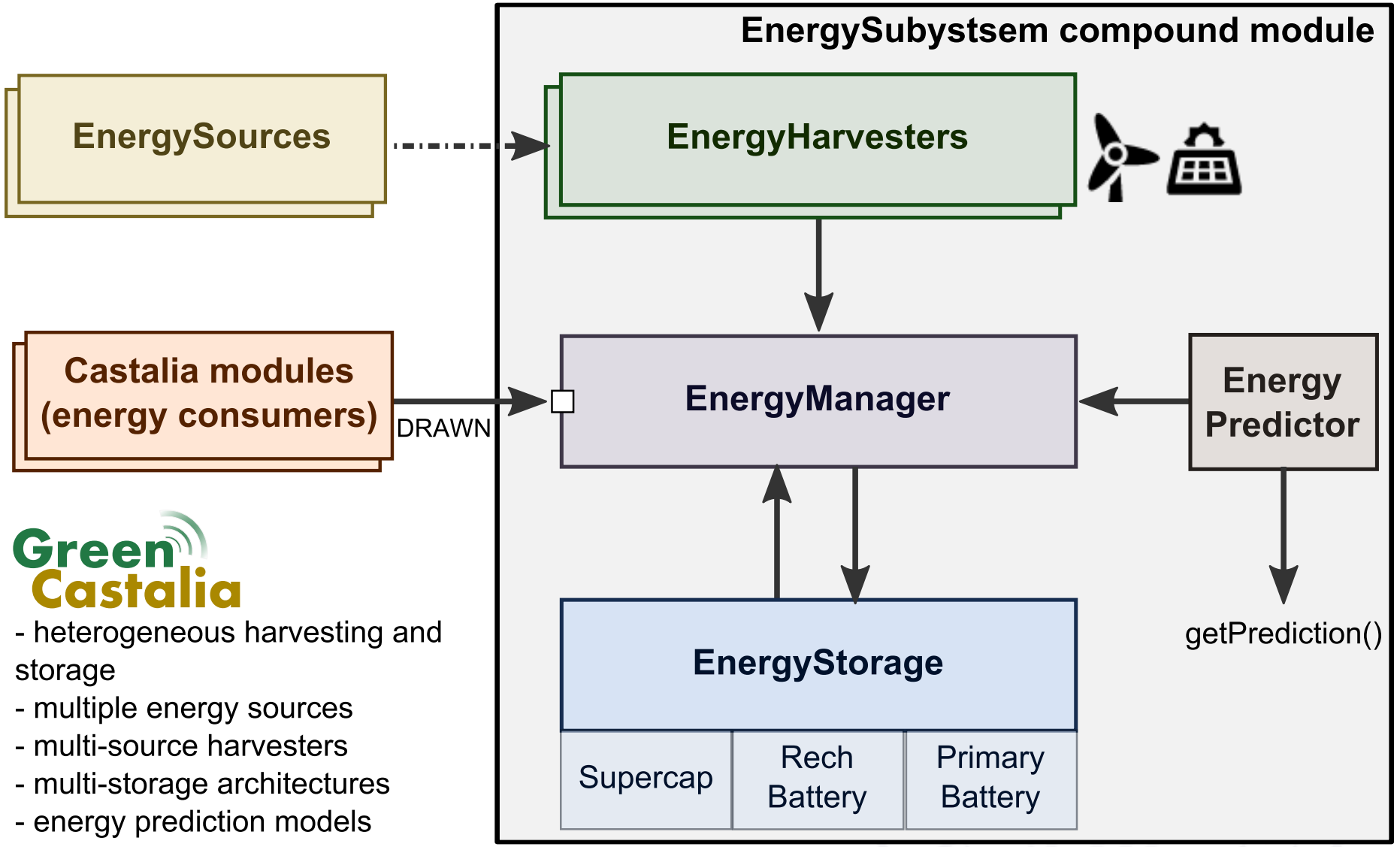
GreenCastalia extension



Green Castalia

- heterogeneous harvesting and storage
- multiple energy sources
- multi-source harvesters
- multi-storage architectures
- energy prediction models

D. Benedetti, C. Petrioli and D. Spenza. GreenCastalia: an energy-harvesting-enabled framework for the Castalia simulator. *Proc. of ACM ENSSys 2013.* http://senseslab.di.uniroma1.it/greencastalia.