ROYAL INSTITUTE
OF TECHNOLOGY

WIDE WP2 research sampler: Reliable real-time over wireless

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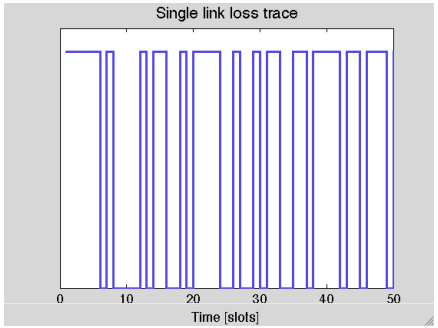
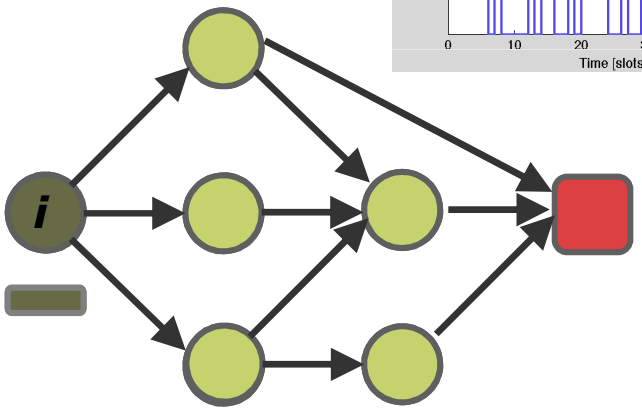
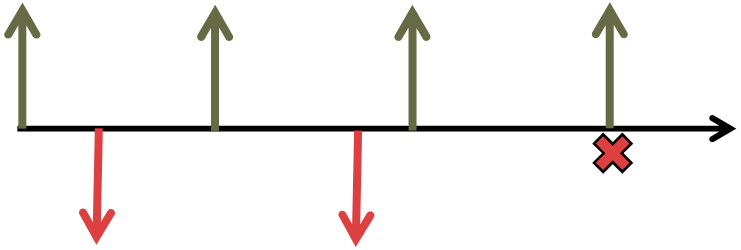
Acknowledgements: Z. Zou, P. Soldati, O. Landsiedel, H. Zhang

Realiable real-time challenge

Meeting hard deadlines on unreliable multi-hop network







Maximize deadline-constrained reliability (the “timely throughput”)

WIDE solutions

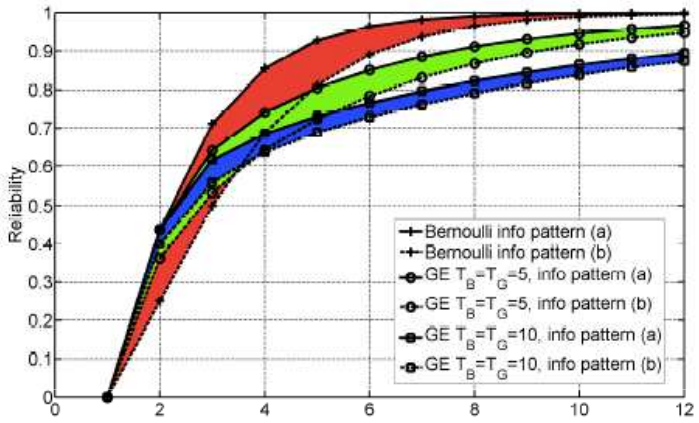
Focusing on *Wireless*HART-compliant real-time scheduling

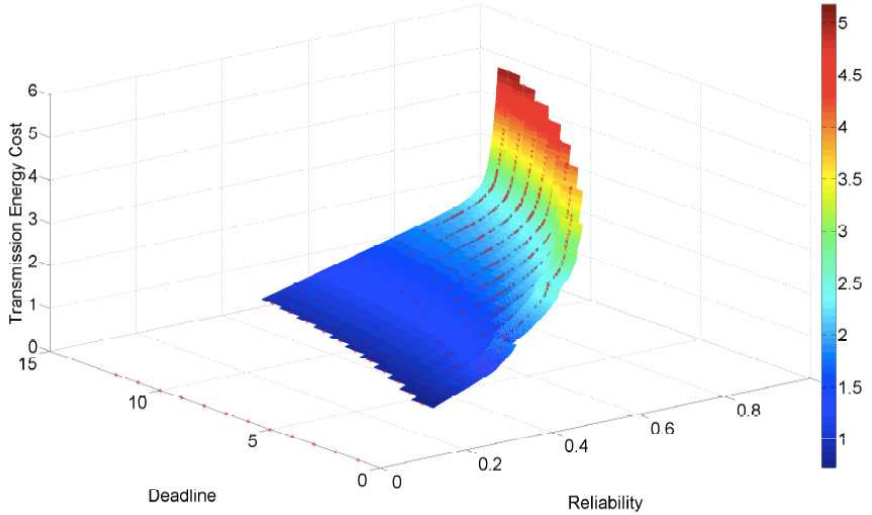
New theory, algorithms and software for network scheduling

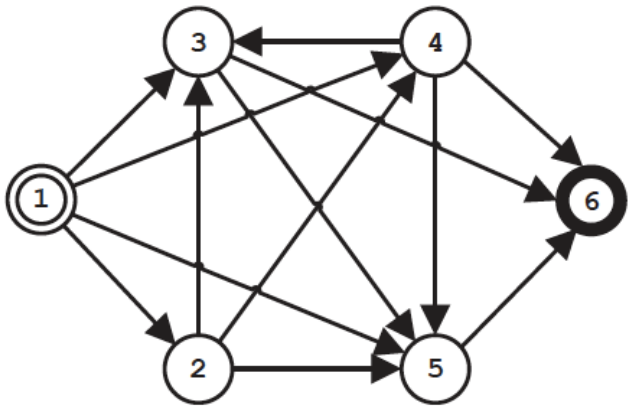
- minimize multi-source data collection delay
- maximize deadline-constrained reliability for unicast
  - joint routing and transmission scheduling
  - independent and bursty links
- understanding energy-implications for reliable real-time

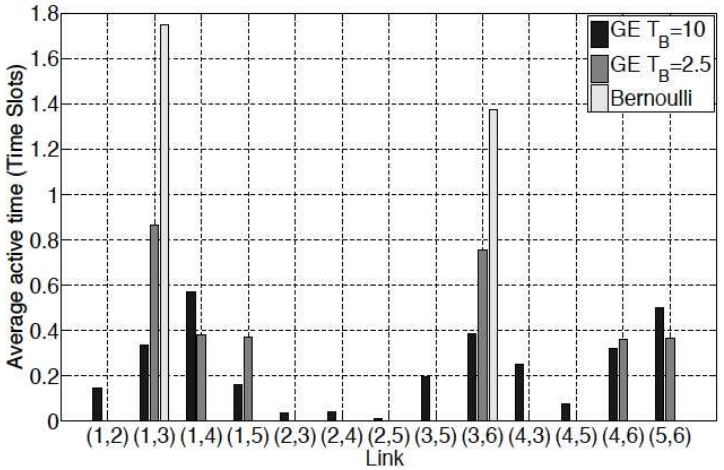
Limits of performance, rules of thumb, and optimal algorithms

Representative results









The realWIN workshop at IPSN

Real-time wireless for industrial applications

Chicago, IL, April 11 2011.
at CPSWeek 2011

Call for papers
Technical program

The first workshop on **real-time wireless for industrial applications** will be held on April 11, 2011 in Chicago, IL as part of CPSWeek 2011. The workshop aims at being an inspiring meeting point for academic and industrial researchers and practitioners to share experiences, challenges and technical research results on real-time wireless for industrial control.

Call for papers.
Recent standardization efforts such as WirelessHART, ISA 100, and related work within the IEEE and IETF now provide end-users with several alternatives for industrial low-power wireless communications. An increasing number of industrial deployments demonstrate the power of these technologies, but also reveal limitations of current theory and practice. At the same time, academic researchers in a range of disciplines are laying the foundations for next generation wireless control systems, developing new networking protocols, resource management techniques and control strategies.

The first workshop on Real-Time Wireless for Industrial Applications brings together academic and industry professional to a one-day technical forum on the design and application of real-time wireless communication for industrial monitoring and control. We solicit technical papers describing original ideas, theory, methodology and experiences from the design, implementation and deployment of reliable real-time wireless communication and control.

Topics of interest include, but are not limited to,

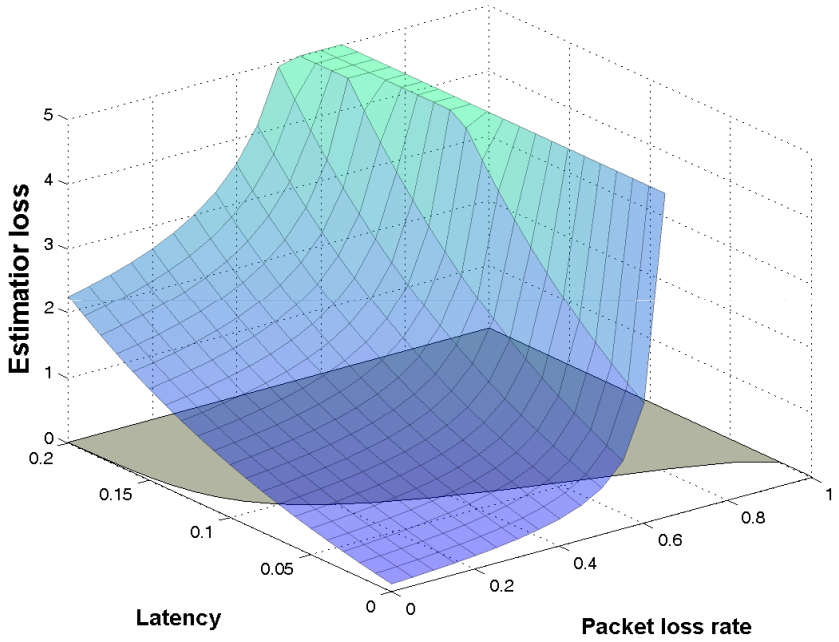
- Protocols for reliable real-time communication over wireless
- Real-time scheduling algorithms and analysis
- Control over wireless networks
- Theoretical and practical performance limits of low-power wireless communications
- Measurements and characterizations from application-oriented deployments
- Network optimization and management
- Architectures for industrial sensor and actuator networks
- Security issues in industrial wireless networks and applications

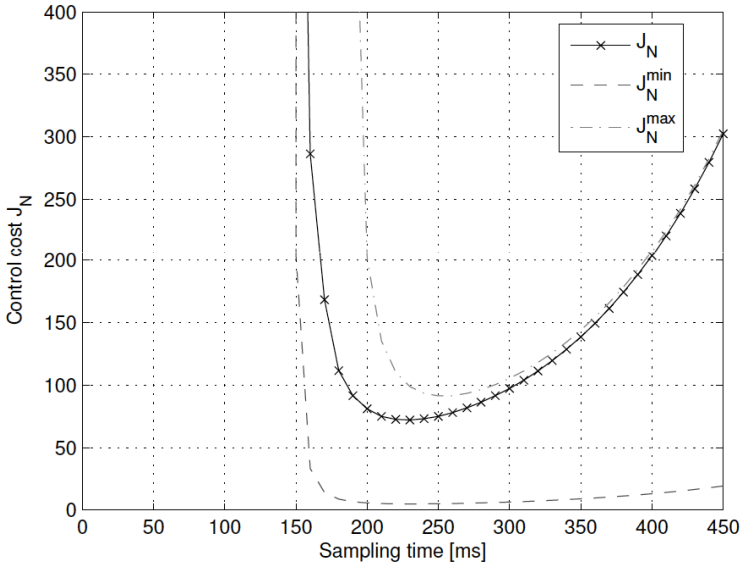
This year's edition of the workshop will not produce any printed proceedings. Rather, we expect that work introduced at the workshop will appear in final form in relevant international conferences and journals. Electronic versions of all papers will be made available to workshop participants.

Paper submission
Contributions are submitted as extended abstracts of 2-4 pages (10 point font, 1 inch margins, standard IEEE or ACM format) via **EasyChair**. The deadline for initial submissions is February 7, 2011. Final contributions will be up to 8 pages.

Optimal co-design

Understanding what controllers need, and what network can provide





Key result: optimal co-design is modular, can be computed efficiently

- deadline-constrained maximum reliability and control under loss
- optimal parameters found by sweeping over sampling interval