TTW – a Predictable Reliable Adaptive and Low-latency Real-time Wireless Protocol

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Wireless is not (yet) widely used in Cyber-Physical Systems (CPS)

Challenging requirements must be met

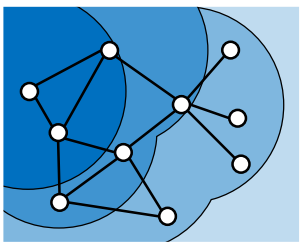
Reliability	99.99 % PRR and above
Low latency	Tens of *ms* end-to-end
Low power	Months to years lifetime

We investigated protocol designs tailored to Wireless Cyber-Physical Systems

A fully time-triggered protocol, statically scheduled can meet those requirements

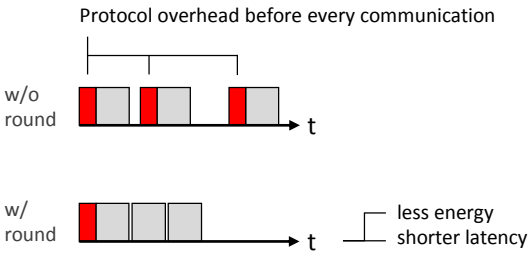
Wireless CPS challenges are addressed by the Time-Triggered Wireless (TTW) protocol

Flooding provides spatial and spectral redundancy

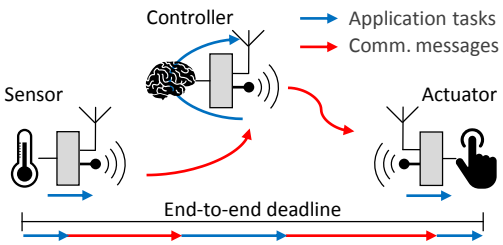


Glossy flood with channel hopping

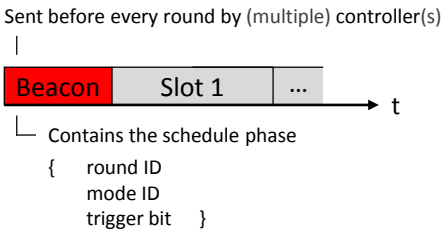
Round-based design limits the protocol overhead



Co-scheduling of applications and communication enables optimized real-time static schedules

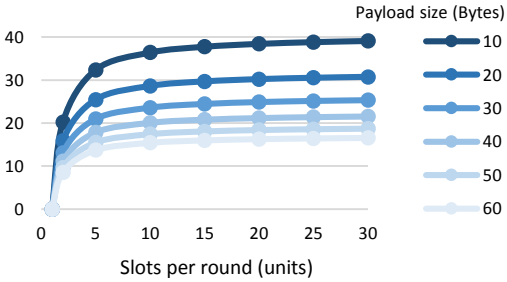


Runtime beacons provide resilience to packet losses and node crashes



System model predicts significant energy savings and validates the suitability for CPS

Energy saving ratio - E (%)



Minimal message latency achievable (ms)