



CISTER - Research Center in
Real-Time & Embedded Computing Systems

Towards Worst-Case Bounds Analysis of the IEEE 802.15.4e

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Motivation



Problem

- ever growing demands of the industry such as timeliness and reliability.
- To address these demands it is mandatory to carryout a thorough network planning in terms of latency and resources.
- To understand these networks' behaviours under worst conditions.

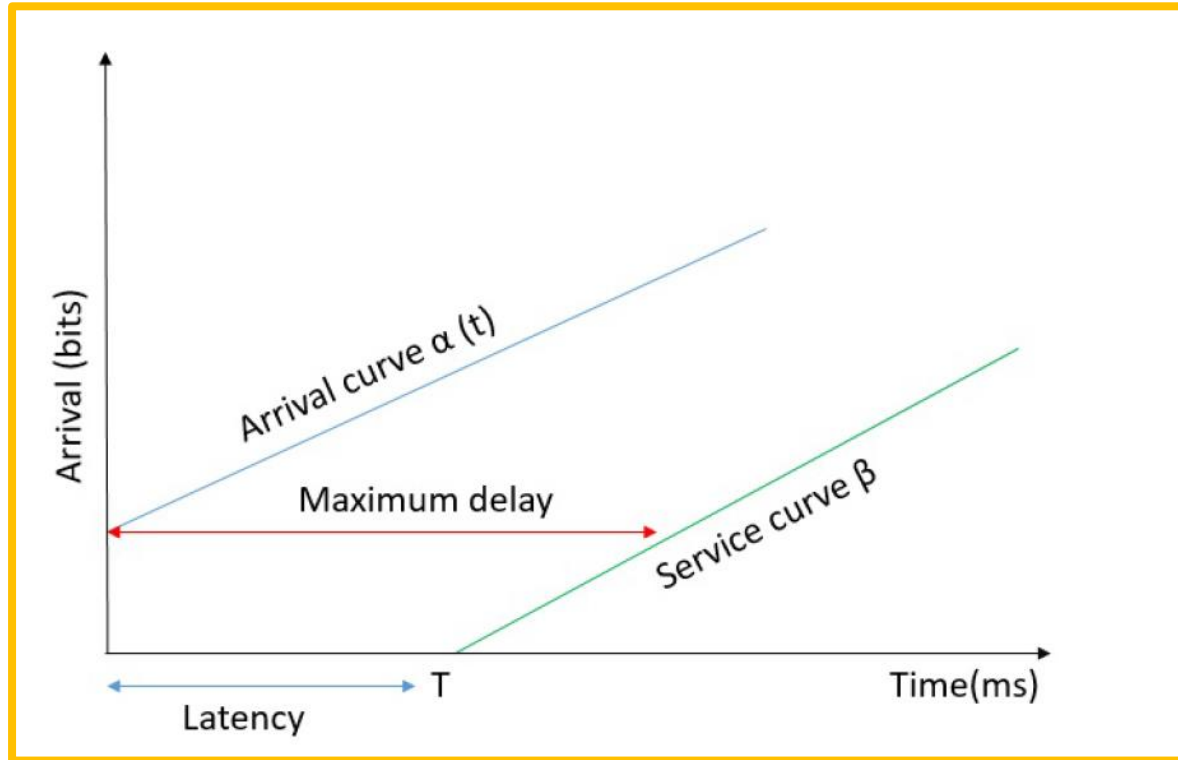


802.15.4e

- The IEEE 802.15.4e amendment provides important functionalities to address timeliness and reliability in time-sensitive WSN applications, by extending the IEEE 802.15.4-2011 protocol.
- Proposes several MAC behaviours, which besides providing deterministic communications are also fitted with a multi-channel frequency hopping mechanisms to accommodate more nodes and meet constraint timelines.
- Deterministic Synchronous Multichannel Extension (DSME) and Time Slotted Channel Hopping (TSCH) are some of the MAC behaviours which are more suitable for time critical applications.

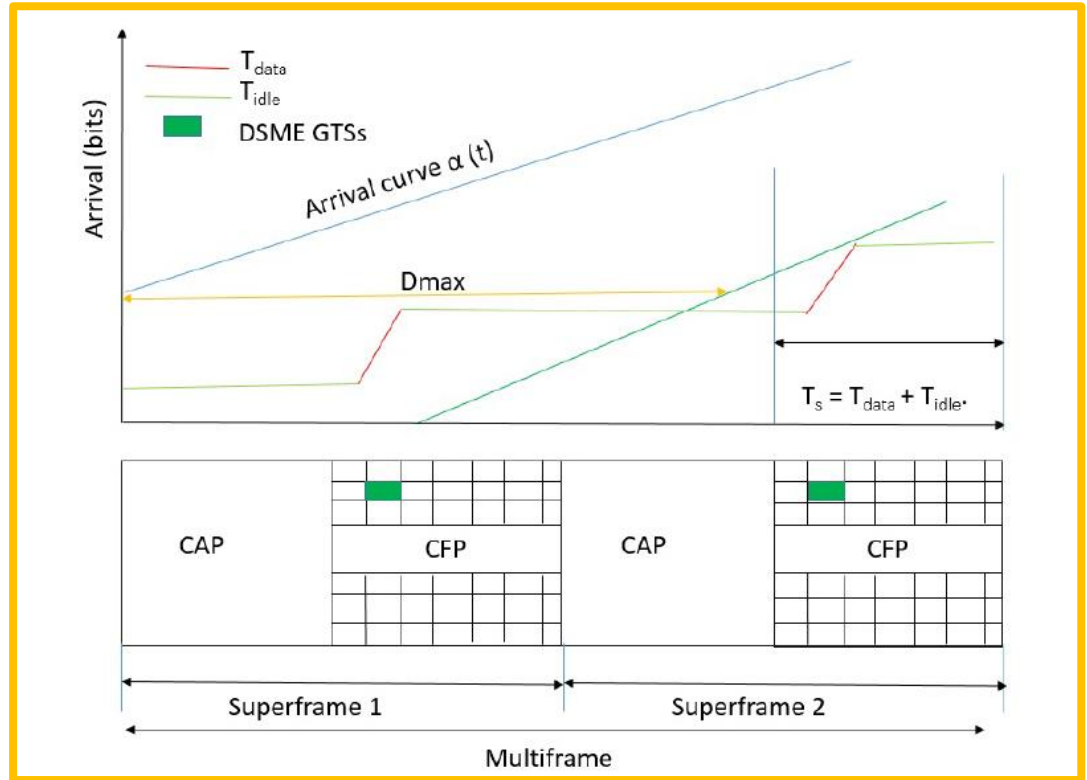


Network Calculus



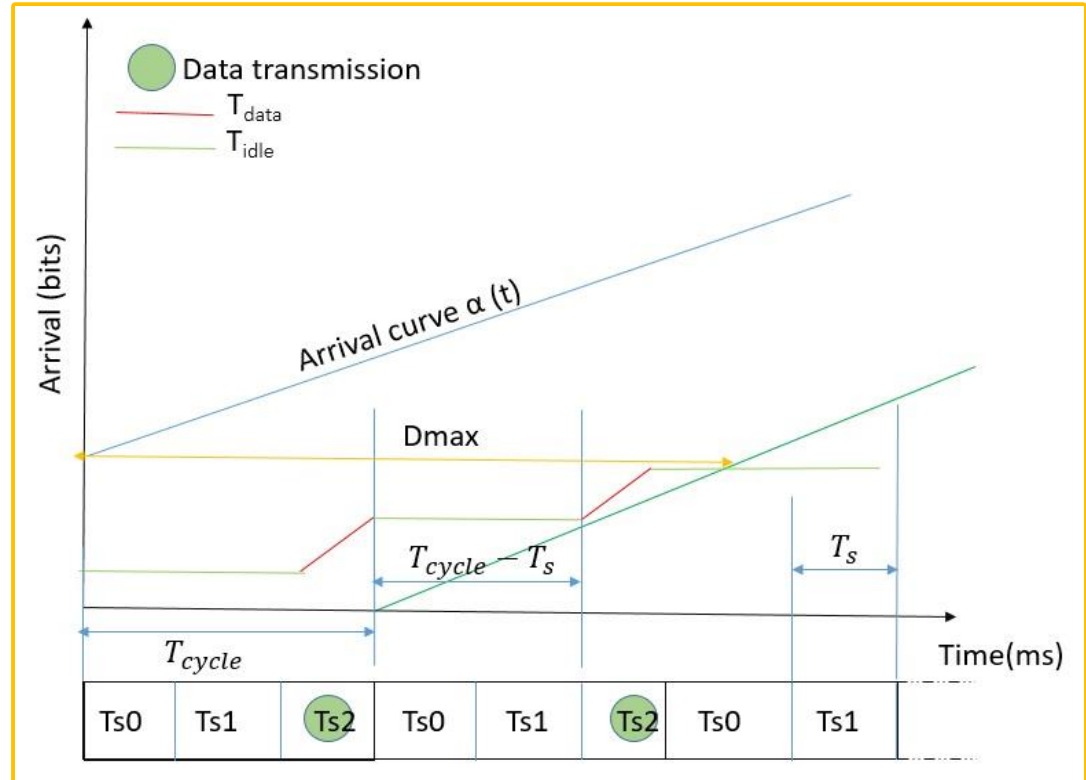
Contributions

- Service curve modeling of DSME and TSCH
- Worst case delay analysis



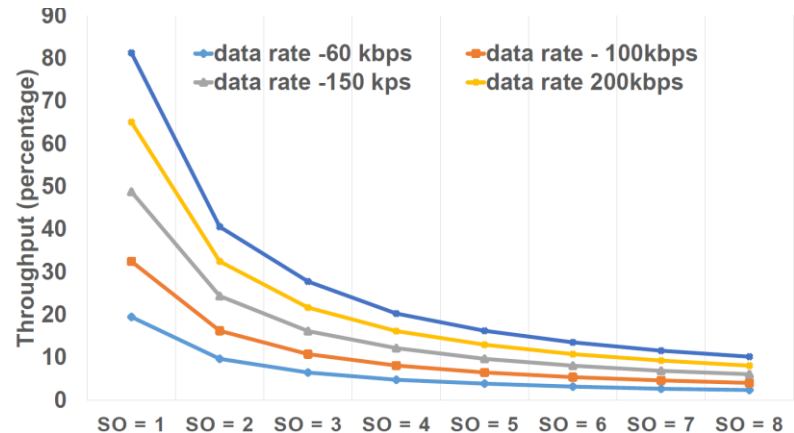
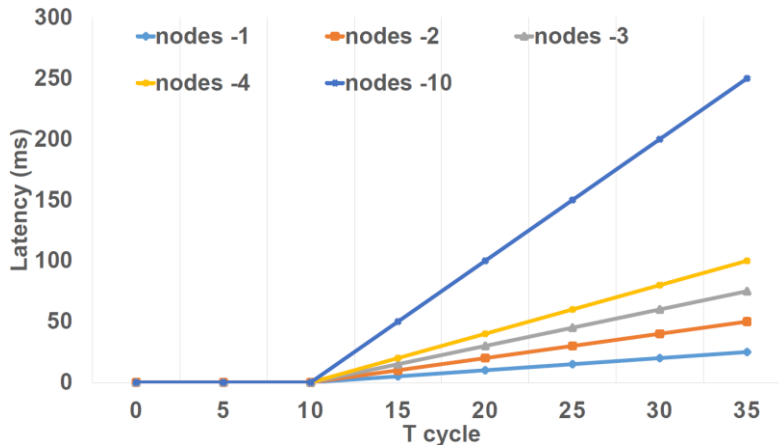
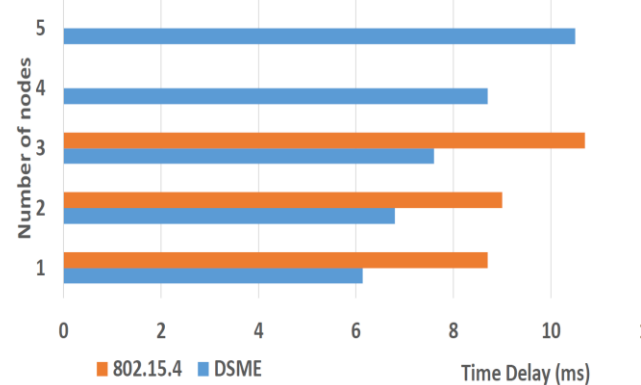
Contributions

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Meanwhile

- Service curve modeling of LLDN
- Throughput and latency analysis of all the MAC behaviors
- Comparison of DSME with 802.15.4
- Implementation of DSME in OpenZB



Future Work

- We aim at implementing our model in real hardware
- We aim at building cross platform technologies



THANKS FOR YOUR KIND ATTENTION

