

# Applicability and Tradeoffs of ICN for Efficient IoT

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# Motivation and Objectives

- How to support efficient and scalable IoT over existing ICN proposals with small changes to the ICN concepts
- The sweet spot is where resource constrained IoT clients/devices have connectivity to resource rich ICN node(s)
  - IoT devices may have intermittent connectivity directly or indirectly to ICN node(s)
- In this draft we cover
  - Advantages and challenges with ICN for IoT in the above described context
  - Examples of design choices and trade-offs to allow for effective, efficient, scalable and secure handling of IoT data in an ICN network

# ICN for IoT

## Advantages (A) and Challenges (C)

- Naming of data and services
  - A: in IoT, sensing and data acquisition is often the goal
  - C: to control/manage devices, to keep names short, to make names known or deducible
- Distributed caching
  - A: less transmissions with IoT devices to retrieve or send IoT data at multiple times and/or to multiple places, saves power and bandwidth, and reduces delay for retrieval
  - C: to handle very dynamic and heterogeneous content
- Decoupling between sender and receiver
  - A: IoT devices may have intermittent network connectivity
  - C: to provide security and real-time data

# Design choices for IoT

where NO changes to ICN are needed

- ICN in concert with existing internet protocols
  - facilitating actuation and control of specific IoT devices
- One-phase direct naming of objects
  - addressable atomic data units with known/deducible names, no advanced “lookup” needed by ICN
- Immutable atomic data units
  - Eliminating cache inconsistencies, a trade-off is that dynamic data must be modeled as a stream of immutable data units
  - name of “latest” value must be deducible
- Capability / data property advertisements
  - Explains how data is structured and addressed (e.g. valid points in time)
  - Advertisements can be disseminated with ICN
- Object security
  - Handled by the IoT framework, no need to modify typical ICN standards

# Design choices for IoT

where additions to ICN concepts would improve efficiency

- The importance of time
  - extensions to ICN naming to represent time (for IoT, live streaming video, etc.)
- Pull and push
  - push is efficient for real-time information, triggered information, alarms, etc
  - Supported by ICN or use other mechanisms (e.g., multicast)?
- Optional meta data
  - For efficiency reasons retrieving meta data (to/from resource constrained nodes) should be optional

# Discussion

- Feedback
- Next steps