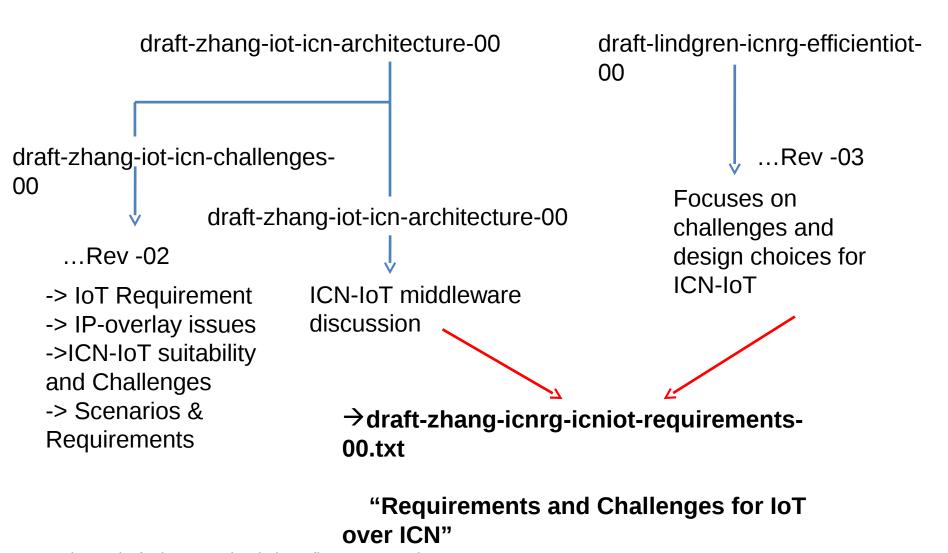# draft-zhang-icnrg-icniot-requirements-00.txt

- Requirements and Challenges for IoT over ICN

Ravi Ravindran and Olov Schelén

(IETF/ICNRG, Yokohama, 94)

[ravi.ravindran@huawei.com]

[lov.schelen@ltu.se]

Authors

- Yanyong Zhang (Winlab, Rutgers)
- Dipankar Raychadhuri (Winlab, Rutgers)
- Alfredo Grieco (Politecnico di Bari (DEI))
- Emmanuel Baccelli (INRIA)
- Jeff Burke (UCLA)
- Ravi Ravindran (Huawei)[ED]
- G.Q. Wang (Huawei)
- Andres Lindgren(SICS)
- Bengt Ahlgren (SICS)
- Olav Shelen (Lulea University of Technology)

Draft History

draft-zhang-iot-icn-architecture-00

draft-lindgren-icnrg-efficientiot-00

draft-zhang-iot-icn-challenges-00

draft-zhang-iot-icn-architecture-00

…Rev -03

…Rev -02

Focuses on challenges and design choices for ICN-IoT

-> IoT Requirement
-> IP-overlay issues
->ICN-IoT suitability and Challenges
-> Scenarios & Requirements

ICN-IoT middleware discussion

→**draft-zhang-icnrg-icniot-requirements-00.txt**

"Requirements and Challenges for IoT over ICN"

- These drafts have evolved since first presented at IETF-90

Draft Objectives

- Identify research challenges on realizing heterogeneous IoT services over ICN.
- Understand IoT requirements to achieve a unified ICN-IoT infrastructure
  - This is considering that, today these are looked in specific scenario context.
- Discuss suitability of ICN for IoT
- Discussion on scenarios, considering solutions will be information-centric, different from host-centric realizations today.

Table of Content

Table of Contents

☐☐

New section on ICN suitability for IoT

• Scenarios presented as a new Appendix section.
• The main text is scenario

Section 4: Advantages of using ICN for IoT

- **Naming of Devices/Data/Services**
  - IoT applications are information-centric in nature
  - ICN focus on inter-connecting Consumers, Services, Content meets IoT requirements
- **Distributed Caching and Processing**
  - Infrastructure Caching/Storages
  - Hierarchical In-Network Processing
- **De-coupling Senders from Receivers**
  - Required considering intermitent connectivity
  - Content replication via caching improves data dissemination reliability
  - Opportunistic forwarding

Section 5: Naming and Name Resolution

These two topics have been separated with some new contributions.

- **Challenges in Naming of Devices/Content/Services**
  - Naming of Devices: actuator services, managing/monitoring, identifiers as part of metadata to make it searchable.
  - Size of Data vs Service Names : Challenges around overhead ICN naming to the data payloads
  - Hash Based Name
  - Metadata-based Naming
  - Flexibility/Trust/Confidentiality

…

- **Challenges related to Name resolution**
  - Agility : dynamic evolution of data
  - Scalability
  - Deployability
  - Latency

Section 5.8/5.9

Included two more ICN challenges for IoT:

- **Self-Organization**
  - Challenges to realize scope based self-orgnization in the constrained and non-constrained IoT infrastructure
  - Security implication across control and forwarding functions such as device/service discovery, naming, topology construction, routing and caching.
- **Communication Reliability**
  - Key for mission critical IoT services
  - Build redundancy and reliability to handle wide range of disruption such as Congestion, short or long term disconnections, last mile wireless impairments.
  - Understand tradeoff between Forwarder complexity and flexibility of deployment choices, considering performance requirements.

Other Changes

- Section 5.6: Security and Privacy
  - Some more elaboration on suitability of object based security model of ICN for ICN-IoT

- Few more recent ICN-IoT work cited [59] [60]
  - For more recent work please do bring it to our notice.

- Section 6 is the Appendix for scenarios
  - For completeness and also being ICN, specific solution design choice and

Future Work

- A good starting point for an ICN-IoT RG document.

- We are proposing it for adoption

- Feedback is welcome on any aspect anytime for improving it and making it more relevant.