Five Years Later: Critical Research Challenges in ICN Five Years After the First ACM ICN Workshop

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Objectives for real world experiments

- **II**: Design and develop key features of **IoT applications**
  - Most studies implicitly assume video and web
- **III**: Design and develop ICN Services
  - ICN roles for distributed and cloud services are not well studied
- **IV**: Adapt ICN to complement **5G**
  - How ICN uses cellular networks is not well studied
- **V**: Improve/resolve solutions to vital functions of ICN based Infrastructure
  - Security/privacy is not well studied
- **VII**: Stimulate general deployment of ICN in the **real world**
  - High speed router implementations for large scale experiments
    - Caching implementation is pre-mature, whereas high speed LPM is well studied

Challenges (I)

- New requirements from IoT applications
  - What communication styles?
    - Request/response or publish/subscribe? Is multicasting support needed?
    - Is in-network processing needed?
  - Naming scheme of IoT devices
    - How are multiple attributes of data such as data type, location, owner specified?
- Mobility support in cellular-based 5G networks
  - Does ICN mitigate strict mobility management in 5G networks?
  - How are ICN mobility functions built into 5G networks?
  - Is really producer mobility needed?
  - Is strict mobility management needed for fixed IoT devices?

Challenges (II)

- A key to high speed routers: caching implementation
  - Is line-late caching feasible in terms of computation complexity and memory bandwidth bottleneck? e.g., 40 Gbps
  - How is a CS (Content Store) is distributed to multiple memory devices in multi-threading environments?
  - How is ubiquitous caching supported?

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