Information-Centric Networking

Seeing the Forest for the Trees
Structure of the Talk

- Background
- Commonalities of Designs
- Differences in Design
- Directions for research
- Conclusion
Background

• Surge of interest in ICN
• Literature difficult to absorb
• Aim is to give a broader view on ICN design
• Key point of the paper: the need for architectural research
Commonalities of Design

- Basic Primitives
- Universal Caching
- Content-oriented Security Model
Fundamental Differences in the Design

• Naming
  Hierarchical human-readable vs self-certifying

• Interdomain Name-Based routing
  On top of BGP vs separate named based routing

• Narrow waist
  Retain IP vs replace IP
Directions for research: Topics that deserve small attention

• Required ICN Mechanisms
• HTTP can be turned into an ICN design
Directions for research: ICN design (1/2)

• Privacy:
  – Content requested available to ICN nodes

• Interdomain Policies
Directions for research: ICN design (2/2)

- Scalable routing:
  - Should handle $10^{12}$ objects

  ICN routing
  - Done at packet speed
    - Routing table <$10^8$ entries
      - Aggregation through hierarchical names
  - Slower than packet speed
    - Content objects larger than requests
      - Request patterns result in small working set
Directions for research: The performance gain of ICNs

• Empirical evidence
  – The fail of cooperative caching
  – The long tail of Content-Sharing Networks
  – Facebook image caching

• Efficiency of caches in the long tail
Conclusion

• Two fundamental questions:
  – What benefits do ICN designs offer?
  – Are ICN designs the best way to achieve those benefits?

• About the paper:
  – Asks the right questions
  – Does not always answer them objectively