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Topology-aware Content-centric Networking

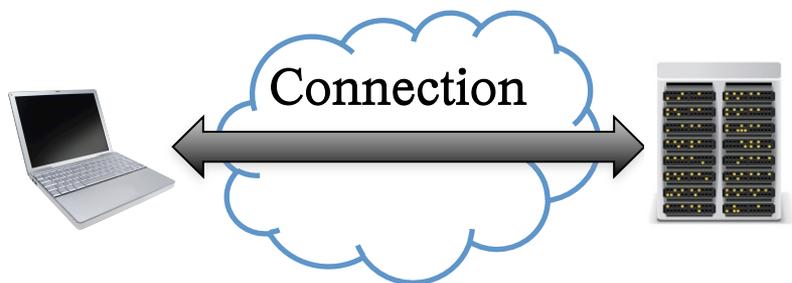
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Outline

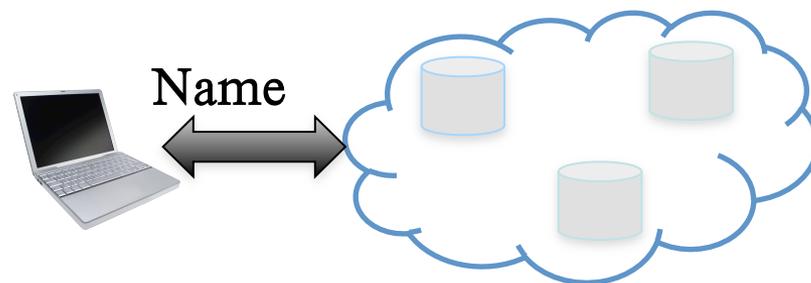
- Motivation
- URL-like Naming Scheme
- Name-based Routing
- Evaluation Plan
- Conclusion

Background

- **Internet Today**
 - value *what* content it contains
 - communicate in terms of *where*.
- **Information-centric Networking (ICN)**
 - Content-sharing communication model
 - Name-based routing, pub/sub, caching



IP: Conversation Model



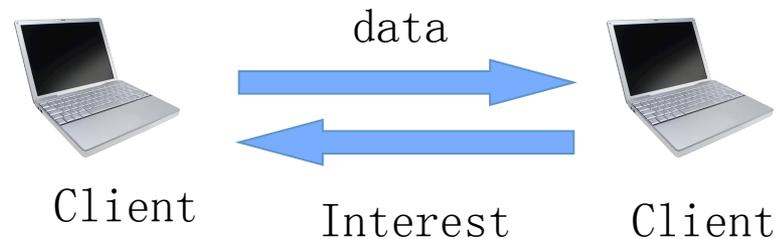
ICN: Content-sharing Model

Challenges

- **Can name be aggregated?**
 - Aggregation by topology, such as IP
 - Flat content name – Can not be aggregated
- **How to address volatile caching replicas?**
 - Huge amount of replicas
 - Dynamic replicas
- **How ICN find local copies?**
 - Topology-aware name-based routings

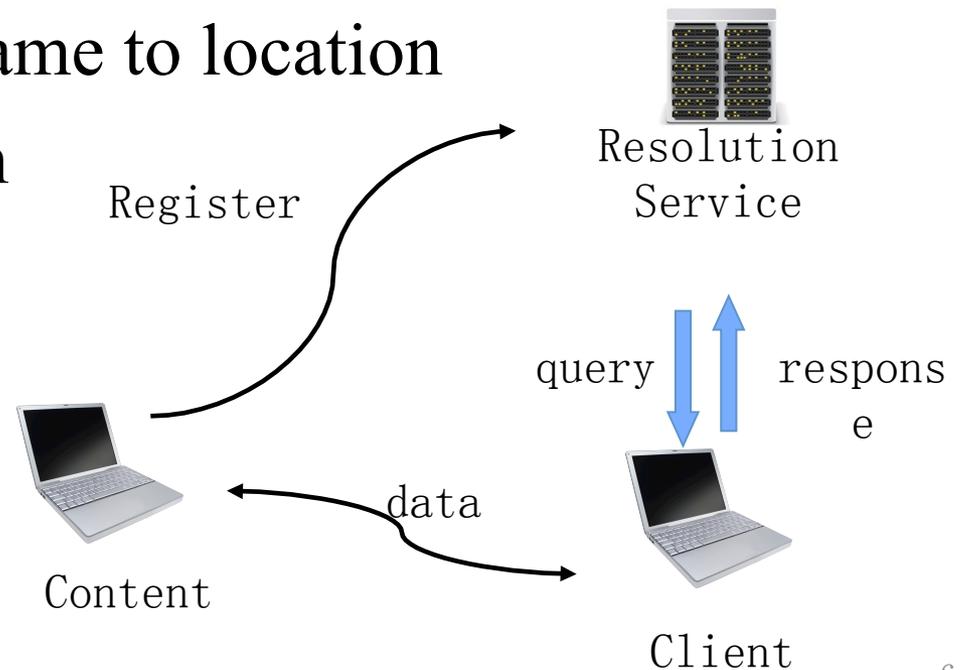
Current works - CCN

- **Naming**
 - Hierarchical name and prefix matching
 - No meaning to routing
- **Routing**
 - Name flooding



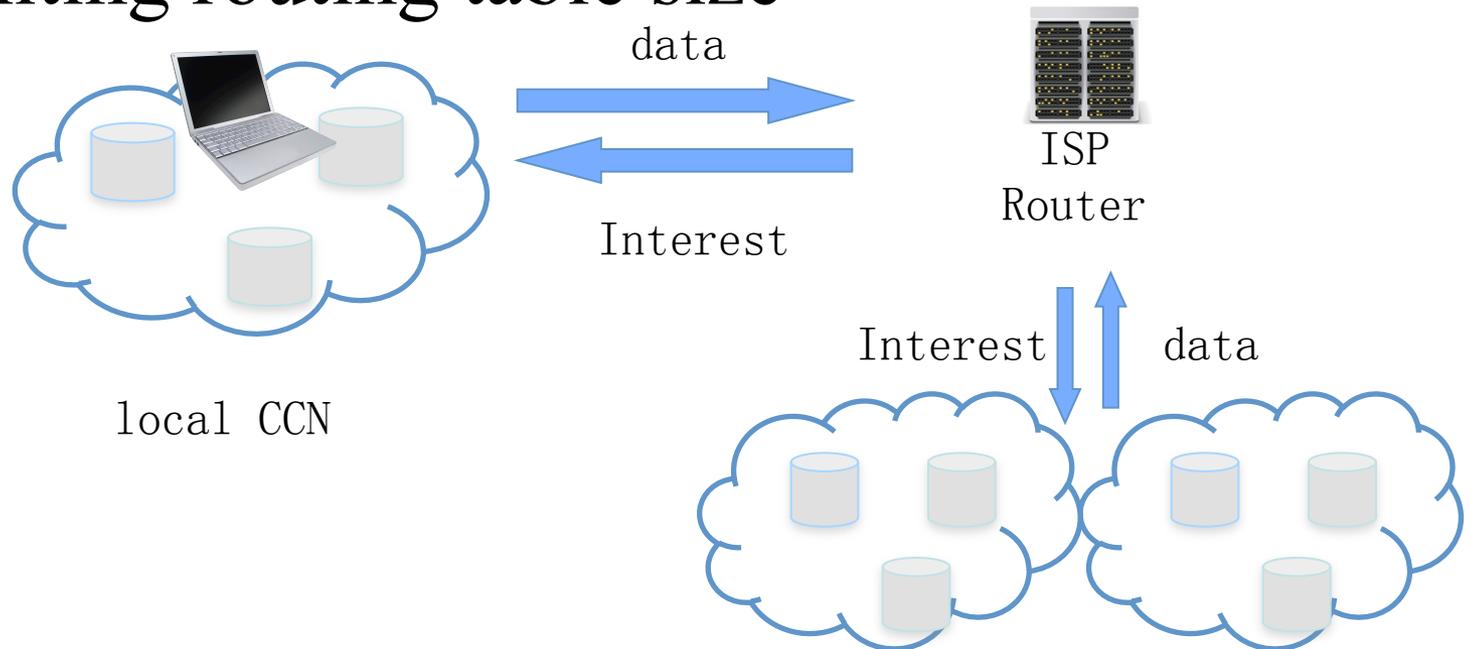
Current works - NetInfo

- **Naming**
 - Flat content name
- **Routing**
 - Mapping content name to location
 - Routing by location



Current works - NDN

- **Hierarchical resolution system**
- **Objective**
 - Limiting routing table size



Our Aim

- **Local accessible**
- **Availability**
- **Scalability**
- **Low overhead**

Our Design

- **Topology-aware name-based routing**
 - Name-based routing + location-based routing
 - Location-based routing: constructing name-based routing table
 - Name-based routing: Accessing local copies

Comparision

	Local Copy	Caching Hits	Routing table size
CCN	random	random	everything in local FIB
NetInfo	controlled by NRS	controlled by NRS	everything in NRS
NDN	random	random	keep part of entries to cut down table size
Proposed	location in content names	extremely high around registries	aggregate by topology

URL-Like Naming Scheme

- Point to registry instead of source
- Keep persistent and authenticated as in CCNx

CCN://icst.pku.edu.cn/tccn.mpg



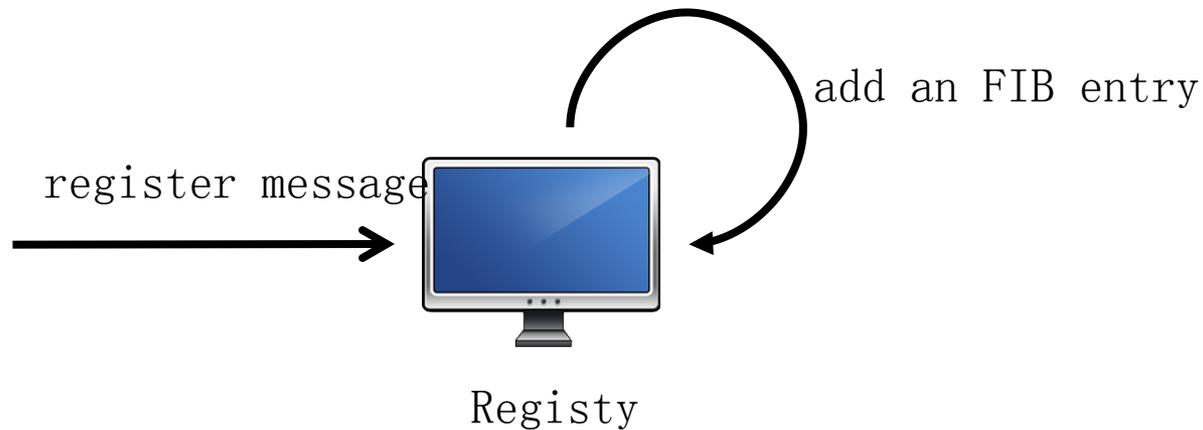
Protocol Name

Register Location

Content Identifier

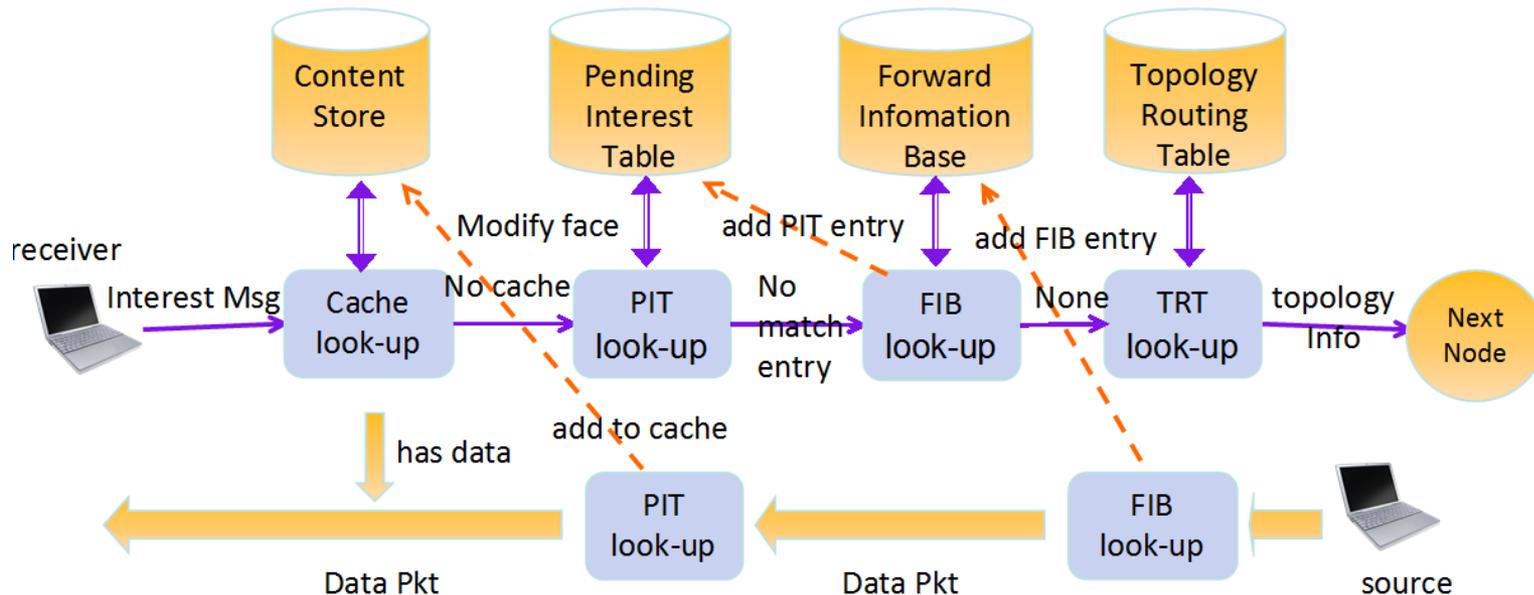
Register

- Any content router can act as a registry.
- Content names are generated by register.

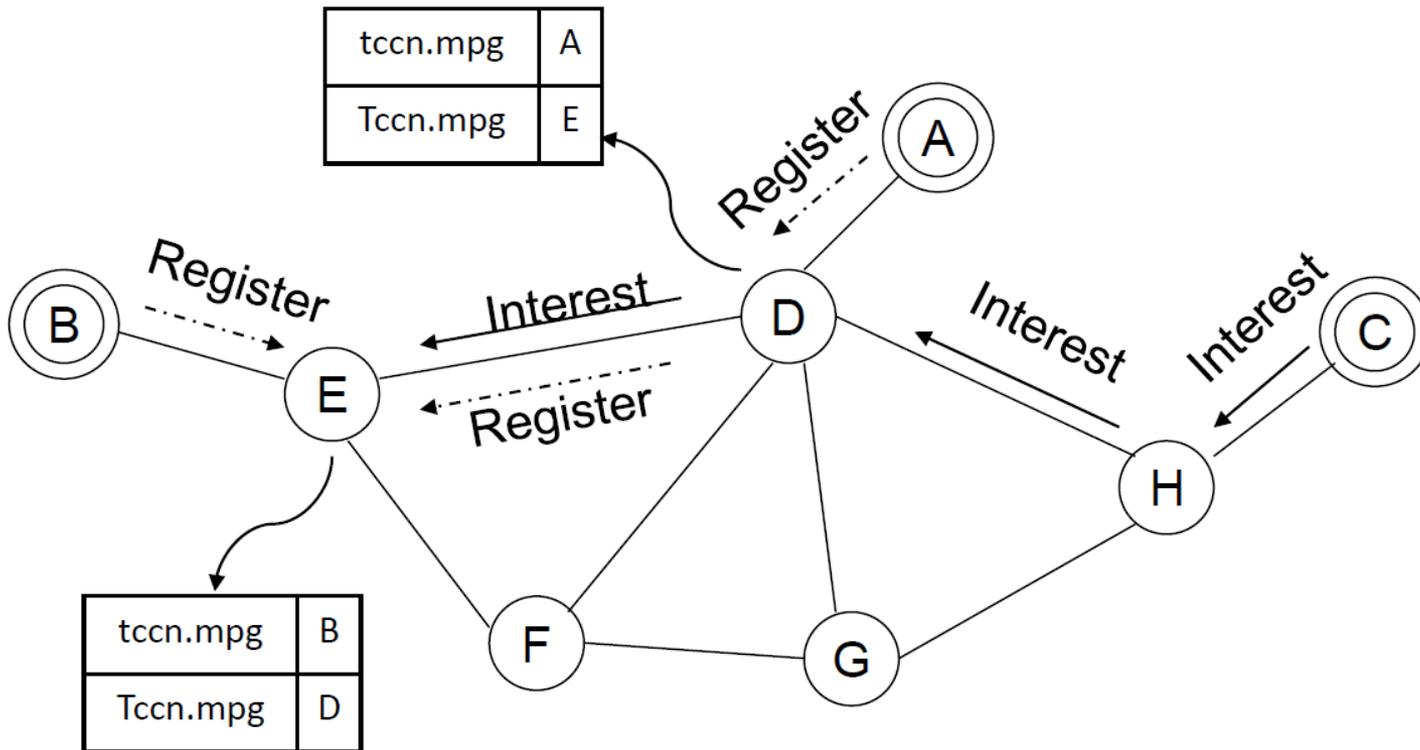


Content Router

- **Topology-aware Routing Table (TRT)**
 - looked up if no match entry in FIB
 - generated automatically by classical protocols



Name-based Routing



Conclusion

- Describe background and motivation of our design
- Introduce a topology-aware name-based protocol
- Improve current naming scheme



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Q & A

Thank you!