A Common API for Transparent Hybrid Multicast - OR - Some Thoughts about ICN & Multicast

Matthias Wählisch, Thomas Schmidt
{waehlisch, t.schmidt}@ieee.org

Freie Universität Berlin

Hochschule für Angewandte Wissenschaften Hamburg
Hamburg University of Applied Sciences

Background: The Common Mcast API

General objective:

- Enable any application programmer to implement group communication independently of underlying delivery mechanisms (i.e., technology)
- Make group applications efficient, but robust w.r.t. deployment aspects

Approach:

- Provide a common interface to access group data

Question: Is the API also suitable for ICN?

This leads to:

1. Is multicast relevant for ICN?
2. What are the differences between multicast and ICN?

What are the differences between (Current) Multicast and ICN?

"Multicast addresses are a set of distributed application names"

John Day (Patterns in Network Architecture)

Rephrase: A multicast address is a distributed name (of content)

Difference:

- Multicast: Content replication initiated by receiver(s)
  - Note: Only *IP* layer multicast is restricted to unbuffered push
- ICN: Content replication initiated by the network infrastructure
  - Caching: Content is somehow available at several nodes

Is Multicast Relevant for ICN?

… why distinguish between multicast content and non-multicast content?

Two perspectives:

- Application programmer
  - Multicast content: Subscribe to stream, wait for arrival
  - Non-multicast content: Access chunk/file, experience error if not available
- Network infrastructure
  - May help in content replication/placement

Networked Content Replication – Why?

Content is accessed:

1. … multiple times by a single node
2. … by multiple nodes in parallel
3. … one-time but should be delivered fast

Observation:

Replication strategy differs from use case!

Consequence:

Distinction in content (multicast type?) may help

Multicast Naming Scheme According to Common Multicast API

`scheme "://" group "@" instantiation ":" port "/" sec-credentials`

- `scheme`: specification of assigned ID
- `group`: identifies the group
- `instantiation`: ID of the entity that generates the instance of the group (SSM source, RP, overlay node)
- `port`: ID of a specific application at a group instance
- `sec-credentials`: optional authentication

Example:

mcast-ip://224.10.20.30@1.2.3.4:5000/groupkey

Advantages of the URI Scheme

- Can express canonical mapping
  - Transparent to names
- Can express source-specific instantiation
  - May solve rendezvous point problem
  - Can simplify routing
- Allows for hierarchical naming
  - Aggregation -> Grouping
- Easy to extend

Conclusion

- Distinction of non-multicast and multicast important
  - Reflect application programming requirements
  - Improve content replication
- Advanced naming scheme may help to reduce routing complexity