

Updated Requirements for NRS in ICN

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In Berlin meeting

- Two presentations on NRS requirements
 - One by ETRI
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 - One by Huawei
 - Lijun Dong, Cedric Westphal, Ravi Ravindran, GQ Wang
- We are merging them into one document

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Use cases of NRS

- Flat name routing support
 - PURSUIT, SAIL, MobilityFirst
- Publisher Mobility support
 - Various projects in literatures
- Scalable routing support
 - NDN's LINK
- Nameless Objects support
 - CCNx's Manifest

Use case 1 : Flat name routing support

- Hierarchical and flat namespaces in ICN
 - Hierarchical name
 - Similar structure to current URIs
 - The hierarchy is rooted in a publisher prefix and enables aggregation of routing information
 - Improves scalability of the routing system
 - Flat name
 - It is not human readable and has a scalability issues to name routing
 - Thus names need to different service
 - NRS is one of the service for flat name routing
 - NRS stores the bindings from object names to topology-based locators pointing to corresponding storage locations in the network

Use case 2 : Provider mobility support (1/2)

- Mobility in ICN
 - Consumer mobility
 - How to return requested data to a moving consumer
 - Supported naturally
 - Mobile consumer can always re-express interests after moving
 - Provider mobility
 - How to forward Interest towards the data created by a moving provider
 - More difficult to support since the name resolution system (in the coupled approach) or the routing tables (in the decoupled approach) need to be updated
 - Even more difficult in CCN/NDN due to the hierarchical name

Use case 2 : Provider mobility support (2/2)

- Solutions [ICNRG interim meeting, January 2016]
 - NDN
 - Design rendezvous mechanisms for interests to meet data generated by the moving provider
 - Forwarding-label draft in CCN
 - Proposed based separation between ID and Locator Names
 - The Mobility Service Controller (MSC) controls the Forwarding-Label Cache Table (FLT)
 - Caches the mapping between the name to the locator

Use case 3 : Scalable routing support

- Map-and-Encap system for NDN routing [TR, 2015]
 - Routing scalability issue in the DFZ of a NDN network
 - If a data producer's prefix is not in the DFZ forwarding table, it needs to establish an association between its own name prefix (e.g., “/net/ndnsim”) and the globally routed prefixes of its Internet service providers (e.g., “/telia/terabits” and “/ucla/cs”) → LINK lookup by NDNS (DNS for NDN)

Use case 4 : Nameless Objects support

- Nameless objects in CCNx
 - Content Object without a name may be retrieved by an Interest with any name and a hash restriction
 - The name in the Interest could identify a location or an object
 - A specified method is needed for distributing those locator names to find nameless objects
 - Using NRS is a one way
 - Using the current manifest proposal, a consumer receives a manifest with the ContentObjectHashIDs and their respective locator information

Questions?