

Requirements for Name Resolution Service in ICN

ICNRG Interim meeting in Prague

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Backgrounds

- draft-jhong-icnrg-nrs-requirements-00 presented at Chicago meeting
 - Two drafts were merged
 - draft-hong-icnrg-nrs-requirements-00 by ETRI
 - draft-dong-icnrg-nrs-requirement-00 by Huawei
- draft-jhong-icnrg-nrs-requirements-01
 - Updated according to the discussion and comments from Chicago meeting
- This document discusses the definition, motivation, and requirements for Name Resolution Service (NRS) in ICN

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Name Resolution Service in ICN : Definition

- The Name Resolution Service in ICN is defined as the service that provides the name resolution function translating an object name into some other information such as locator and another name that is used for forwarding the object request
 - NRS shall be provided by ICN infrastructure when it is needed

Name Resolution in ICN routing

- Name resolution is defined as the first step of ICN routing in RFC 7927
 - ICN routing may comprise three steps:
 - (1) Name resolution : translates the name of the requested NDO into its locator
 - (2) Content discovery : routes the request to the data object based on its name or locator
 - (3) Content delivery : routes the data object back to the requestor

Three approaches on name resolution

- Standalone name resolution approach
 - The name resolution step in ICN routing is separated from the discovery step
 - Ex. DONA, PURSUIT, SAIL, MobilityFirst
- Name based routing approach
 - The two steps are integrated
 - Ex. CCN, NDN
- Hybrid approach
 - Name based routing approach can be performed from the beginning
 - When it fails at certain router, the router can go back to the standalone name resolution approach
 - Standalone name resolution approach can be performed to find locators of routers which can carry out the name based routing of the client's request

Comparisons of two approaches

	Standalone name resolution approach	Name based routing approach
Update overhead	<ul style="list-style-type: none">- Updates propagation in part of the name resolution system	<ul style="list-style-type: none">- Floods part of the network for update propagation- In the worst case, may flood the whole network
Resolution capability	<ul style="list-style-type: none">- Guarantees the resolution if it is registered to the name resolution system	<ul style="list-style-type: none">- Can only promise content resolution with a high probability, depending on the flooding scope
Node failure impact	<ul style="list-style-type: none">- Node : name resolution system server- May cause some content resolution fail even though the content is available	<ul style="list-style-type: none">- Node : routers maintaining name based routing tables- Does not exist because other alternative paths can be discovered to bypass the failed routers
Maintained databases	<ul style="list-style-type: none">- Name to locator mapping in the name resolution system- Routing tables in the routers on the data forwarding plane	<ul style="list-style-type: none">- Name routing table- Breadcrumbs for reverse routing of content back to the requester

Motivation of NRS (1/2)

- Handling heterogeneous names in ICN (added some analyses)
 - Hierarchical name such as URLs
 - Flat name such as self-certifying IDs
 - Human readable name
 - Non-readable name
- Handling Dynamism in ICN (needs more work)
 - Mobility
 - Multi-homing
 - Migration
 - Replication

Motivation of NRS (2/2)

- Use cases of NRS : how name resolution is used in literatures/projects
 - Flat name routing support in PURSUIT, SAIL, MobilityFirst
 - Publisher mobility support in various projects in literatures
 - Scalable routing support in NDNS (DNS for NDN)
 - Manifest support for Nameless Objects in CCNx's

Requirements for NRS

- On service/system/security aspects

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Questions?

Adoption as ICNRG work item?