

Architectural Considerations of ICN using NRS

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Draft purpose

- This document discusses architectural considerations and implications of ICN related to the usage of the NRS
- It describes that how ICN architecture changes and what implications are in the routing system when NRS is utilized in ICN

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Background

- The name based routing in ICN poses a number of issues, such as
 - global scalability of routing
 - producer mobility
 - off-path cache
 - etc.
- In order to address these issues, the name resolution function as a NRS has been applied to several ICN projects and literature

Implications of NRS in ICN

- In general, NRS is not mandatory in an ICN architecture
- Thus adopting a NRS would change the ICN architecture at least on
 - Procedure
 - The procedure of the name resolution has to be added
 - When added, need to consider who and how the resolution does
 - Latency
 - The additional latency of the resolution obviously occurs
 - The total latency could be minimized if the nearest copies or off-path caches can be found
 - trade-off between the resolution latency and inter-domain traffic reduction
 - Security
 - authentication of NRS messages and name spaces
 - protecting NRS entities from DoS or DDoS attacks

ICN architectural considerations for NRS : *Resolution (1/3)*

- Who does the resolution?
 - can be done by consumer, routers, or both
- How does the resolution?
 - might be always resolved to identifiers in a different namespace just like DNS lookup
 - a NRS is ever needed to map names to a different namespace

ICN architectural considerations for NRS : *Protocols and Semantics (2/3)*

- In order to develop NRS system, new protocols and semantics should be designed to manage and resolve in between different name spaces
- NRS can be implemented by
 - extension of basic ICN TLV format and semantics
 - using its own protocols and semantics

ICN architectural considerations for NRS : *Routing System (3/3)*

- How to process the resolved information by NRS lookup
 - can be used just to construct tunnels resulting in NRS identifying tunnel endpoints
 - Can be used as routing hints in request messages
 - In this case, request message needs to be re-written by the resolved information including the original name that was requested by consumer to check the data integrity

Security considerations

- Name Space Separation
 - Secure management of namespaces
 - Secure mapping in between different namespaces
- NRS System
 - Security on new entities of NRS system
 - Can be a single point of failure
- NRS Protocols and Messages
 - Security on NRS messages such as lookup, registration, update, etc.

Looking for contributors!

Questions and comments?