PID: A Generic Naming Schema for Information-centric Network

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Background

- Naming a content object is fundamental for ICN
  - Affect all other design options
- There are multiple roles for a name, for example:
  - R1 (relatively unique) -- identifying
  - R2 (always locatable) - routing
  - R3 (readable/semantic) – meaning (to app)
  - R4 (bindable ) – security verifier
  - R5 (trustable) – trust verifier
- Previously, community try to achieve many roles with single-entity name
  - Flat name
  - Hierarchical readable name
  - Hierarchical flat name
- We propose a different way
  - A name consists of multiple entities
  - Each for different purposes
P:I:D naming schema

- I is the identifier of the object
  - can be something chosen by publisher
  - can be hierarchical or flat, user-readable or non-readable, and location-independent.
- D is the domain that provides resolution from identifier to the real location of the object by routers.
  - The locator of the target object if the locator is persistent;
  - The resolution service name which maps the content identifier to its real location, if the resolution service name is persistent;
  - A resolution service name that maps the content identifier to another resolution service name or location, that is, a meta-domain;
  - Any combination of above.
- P is the principal to bind the object with complete name for security purpose
  - for different relationships, e.g., ownership, administration, and social relations.
  - usually constructed by hashing the public key of the principal, or the hashing the content object itself if it is static.
Generalized naming scheme
P:I:D naming resolution protocol

1. Check CS with (P:I)
2. If yes return PDU
3. Else, routing I_PDU with D
4. Obtain content location
5. Augment I_PDU with location
6. Retrieve content with I_PDU

D
(A name resolution service)

D'

PDUs before movement
Resolution update
PDU after movement

I_PDU (P:I:D)

Application

A content name (P:I:D)

Content publisher/owner
Features

- **Multi-home of content**
  - with multiple domains in one name
  - Which supports multiple NRS at the same time

- **Mobility support**
  - Late-binding of address to PDU

- **Flexibility**
  - Support names in legacy and ICN proposals

- **Strong binding**
  - Enable efficient check if a content is correctly named in network

- **Enable trust verification at end side**
  - With help of external trust management mechanisms (e.g., PKI)
Example
Thank You

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