

Device and Network naming structures and ICN for IoT applications

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Prologue

- Definitions rule the way we think about things
- To talk about device and network naming structures and avoid a lot of debate that I should be aware of, I will do the symbol grounding beforehand

Definitions

- Name
 - A unique string, n , over some alphabet, A , that unambiguously identifies an object or a set of objects
- Address
 - A topologically significant name, which unambiguously identifies a way to reach an object or a set of objects
- Namespace
 - A set N of names from which all names for a given collection of objects are taken

Playing with definitions

- Let us think about a name:
 - Barcelona
 - It is a name
 - It is not unambiguously globally unique in two namespaces!
 - Cities
 - Barcelona City, Barcelona the Province, Spain
 - Barcelona, unincorporated community in Crawford County, Arkansas, USA
 - Barcelona City, capital of Anzoátegui State, Venezuela
 - Football clubs
 - Football Club Barcelona, Spain
 - Barcelona Sporting Club, Ecuador

Playing with definitions

- When does a name become an address?
 - When within a scope, there is an understandable location mapping between names
 - If I was talking to a person in Spain over the phone and said “I am in Barcelona”. What would my listener suppose?
 - If I was talking to a person in Venezuela over the phone and said “I am in Barcelona”. What would my listener suppose?

Definitions - cont.

- Interesting implications:
 - Every noun is a name
 - Some names are addresses in some scopes
 - Addresses do not refer to an object, they tell you how to get to an object
 - Addresses can be a composition of names

What things should we name in networks?

- The best guide I could find is in RFC 1498
 - Service and Users
 - Functions that one uses and the clients that use them
 - Nodes
 - Computers that can run services or user programs
 - Network attachment points
 - The place where a node is attached
 - Paths
 - The run between network attachment points

How do we use names to reach a service? - According to RFC 1498

- 1) Find a node on which the required service operates
- 2) Find a network attachment point to which that node is connected
- 3) Find a path from this attachment point to that attachment point

How do we obtain the names to locate a service? - According to RFC 1498

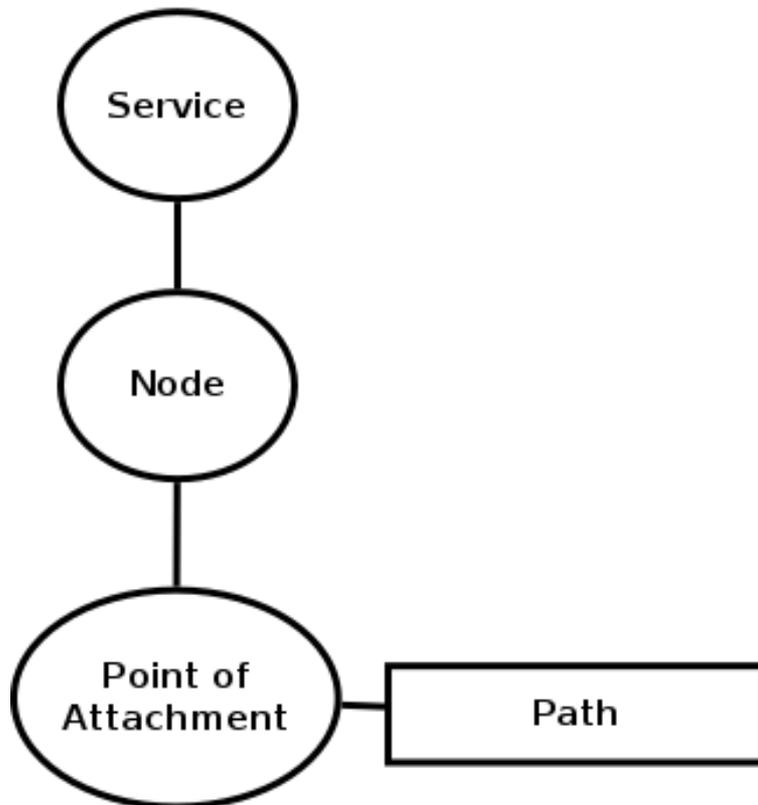
- Three conceptually distinct binding services
 - Service name resolution
 - Identifies nodes that run the service
 - Node name location
 - To identify attachment points that reach the nodes found in Service name resolution
 - Route service
 - To identify the paths that lead from the requestor's attachment point to the ones found in Node name location
 - Device name location and function
 - To identify IoT to access the specific device.

Properties of named objects – According to RFC 1498

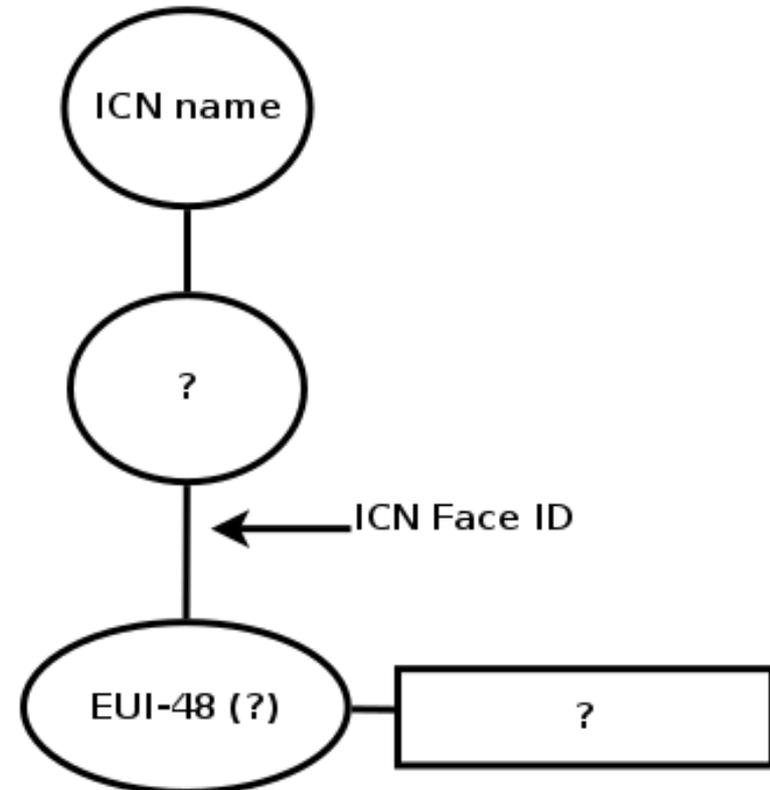
- A service may run at one or more nodes and may need to move from one node to another without losing its identity
- A given node may be connected to one or more network attachment points and may need to move from one attachment point to another without losing its identity as a node
- A give pair of attachment points may be connected by one or more paths, and those paths may need to change with time without affecting the identity of the attachment points

Mapping RFC 1498 to ICN

RFC 1498 ideal



My interpretation of mapping RFC 1498 to ICN



Discussion

- I am not sure if what RFC 1498 talks about Paths has any use
 - Depends on the definition which is vague
- I suppose that ICN names count as “Services”
 - If we use it for more things, doesn't it overload it?
- The namespaces that RFC 1498 talks about seem independent
 - Should they be?
- ICN does ever mention Node names
 - Are they truly unnecessary?
 - Could this idea clear up ICN Echo-reply results?

Thank you for your attention

Acknowledgment

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