PID Property Extension for ALTO Protocol

draft-roome-alto-pid-properties-03

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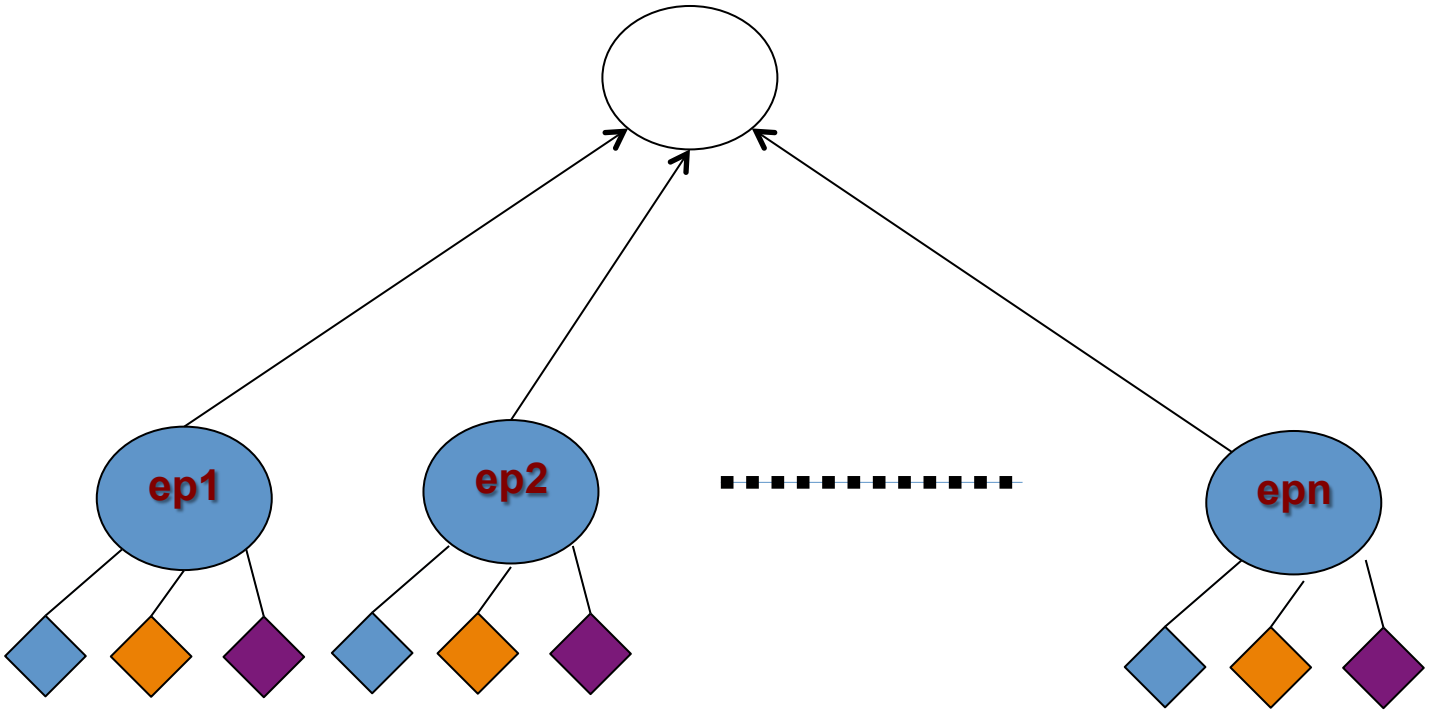
Outline

- How this document fits in the bigger picture
- Key change in –v03: redefine inheritance

How this Document Fits in the Bigger Picture?

- The ALTO Protocol (RFC to be) defines basic ALTO structure:
  - but defines only one endpoint property
- draft-deng-alto-p2p-ext-03 defines a specific set of endpoint properties
- This document *complements* draft-deng-alto-p2p-ext-03, to define a framework to provide endpoint properties efficiently
- Together, they address charter milestone: May 2015 - Submit endpoint property extension document

Problem

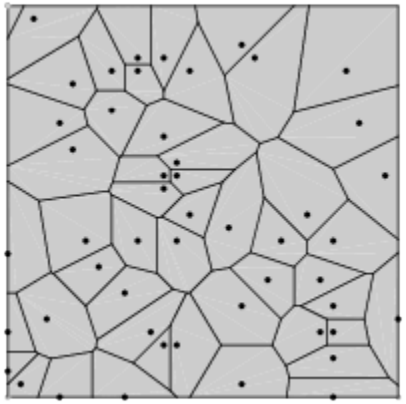


- The number of endpoints can be on the order of billions.
- Configuring, storing, and retrieving per endpoint is not scalable.

PID Property Value as Aggregation of Endpoint Property Values in the PID

- Denote
  - PID `pid` which consists of a set of endpoints {`ip1`, `ip2`, …, `ipn`}
  - `ip1.prop` as the value of `prop` of endpoint `ip1`
  - `pid.prop` as the value of `prop` of PID `pid`
- Conceptually, ALTO Server computes

  `pid.prop = aggreg(ip1.prop, ip2.prop, …, ipn.prop}`
- Possible `aggreg` functions include:
  - average/mean,
  - mode (degenerate to common if all same value),
  - geo-center,
  - union,
  - bounding box,
  - …
- Meaningful `aggreg` depends on `prop`



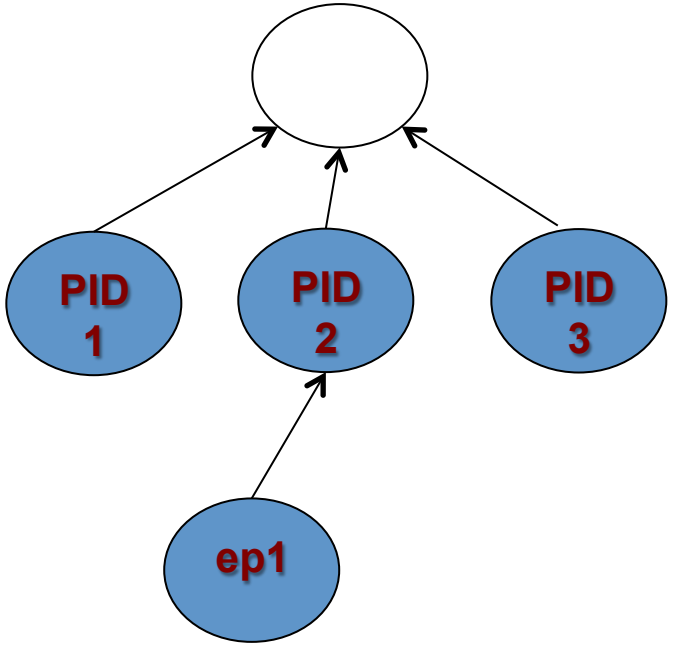
Full & Filtered PID Property Services

- Full PID Property Service returns property values for all PIDs
  - New media type, application/alto-pidprop+json
  - Like EPS response message, but with PID names
- Filtered PID Property Service returns selected property values for selected PIDs
- PID Property Services announce available properties as IRD capabilities:

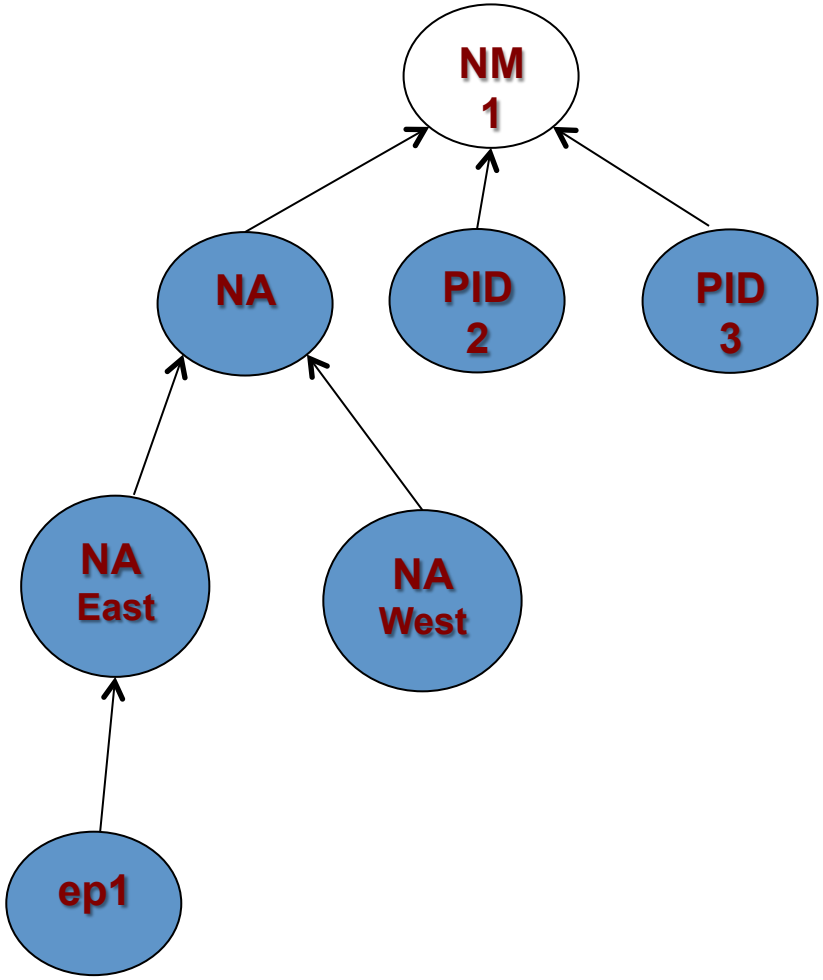
```
"pid-property-1" : {
    "uri" : "http://alto.example.com/pidprop/netmap1/pidp1",
    "media-type" : "application/alto-pidprop+json",
    "uses" : [ "my-default-network-map" ]
    "capabilities" : {
        "prop-types" : [ "country-code", "asn" ]
    },
},
```

Endpoint and PID Properties Relation: Inheritance Override

- They are defined in the same name space
- If the same property (e.g., geo-location), is defined for both an endpoint and its PID, the endpoint property *overrides* the PID property
- Potential extension to EPS:
  - EPS IRD indicates that the default of a Property is from a given PID Properties Resource



Inheritance Definition in –v02

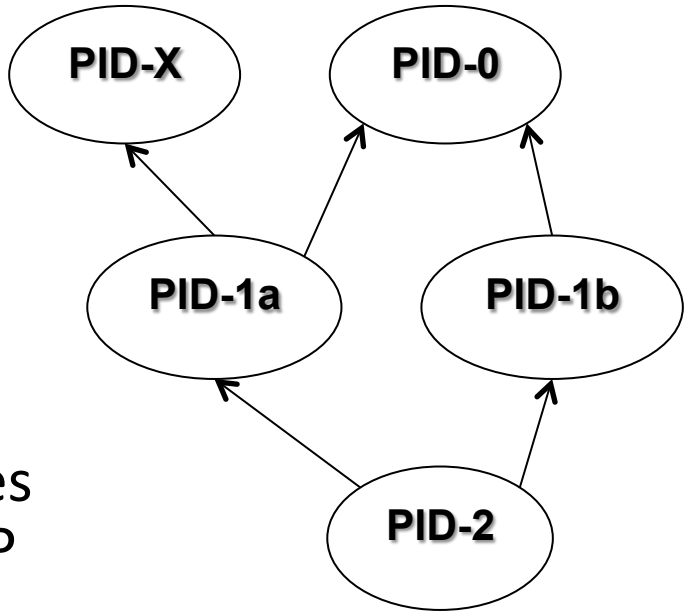


Assume PIDs form a parent-child tree

- Child PIDs inherit properties from parent
- Child PIDs override parent property

Changes from in -v03: PID Property Inheritance

- Problem with –v02: PIDs have the usual multi-inheritance issues
- Insight:
  - Prefixes (CIDRs) are single-parent
- Approach:
  - A PID *inherits* property P iff all prefixes in the PID inherit the same value for P



- Benefit: Preserves useful cases, avoids pathological ones
- Example: If all CIDRs in PID-2 are covered by CIDRs in PID-0, then PID-2 inherits properties from PID-0 that are not overridden in PID-1a or PID-1b

Thank you.