

PID Property Extension for ALTO Protocol

draft-roome-alto-pid-properties-02

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How this Document Fits in the Bigger Picture?

- The ALTO Protocol (RFC 7285) 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

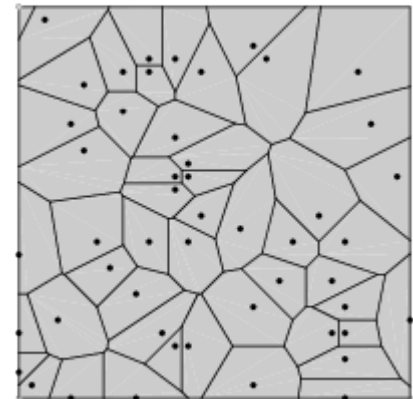
What Are PID Properties?

- Same concept as Endpoint Properties, but for PIDs
- Endpoint & PID properties share a name space
 - Some properties only valid for endpoints, some only for PIDs
 - But most apply to both
 - Specify when registering property name with IANA

Where Do PID Property Values Come From?

Take 1: From The Endpoints (Bottom Up)

- Denote
 - PID pid which consists of a set of endpoints $\{ip1, ip2, \dots, ipn\}$
 - $ip1.prop$ as the value of $prop$ of endpoint $ip1$
 - $pid.prop$ as the value of $prop$ of PID pid
- Conceptually, ALTO Server computes the aggregate
$$pid.prop = \text{aggreg}(ip1.prop, ip2.prop, \dots, ipn.prop)$$
- Possible aggreg functions include:
 - average/mean,
 - mode (degenerate to common if all same value),
 - geo-center,
 - union,
 - bounding box,
 - ...
- Meaningful aggreg depends on $prop$



Where Do PID Property Values Come From?

Take 2: From The PIDs (Top Down)

- Other PID Properties are inherent from the server's definition of the PID
 - E.g., the value of the `isp-name` property for a PID is the ISP which owns that PID's prefixes
- Can use bottom-up, top-down, or a mixture

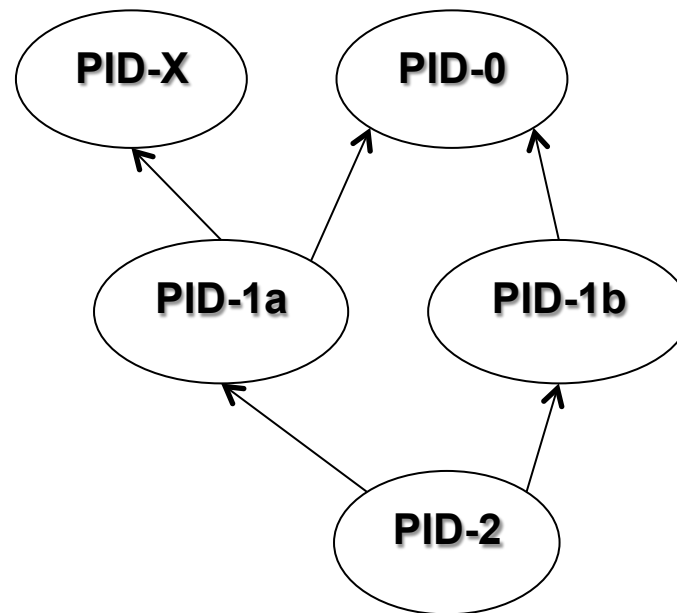
New ALTO Services

- Full PID Property Service (PPS)
 - Returns map with property values for all PIDs
 - Like EPS response message, but with PID names
 - New media type, `application/alto-pidprop+json`
- Filtered PID Property Service
 - Returns selected property values for selected PIDs
- IRD gives services & their available properties:

```
"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" ]  
  },  
},
```

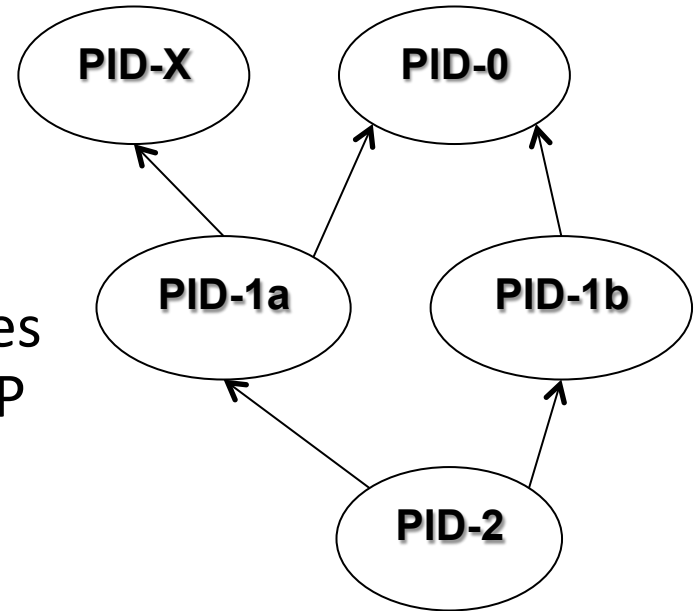
PID Property Inheritance

- PIDs can refine other PIDs, so nested PIDs could inherit properties from parent PIDs
- But we have the usual multi-inheritance problems



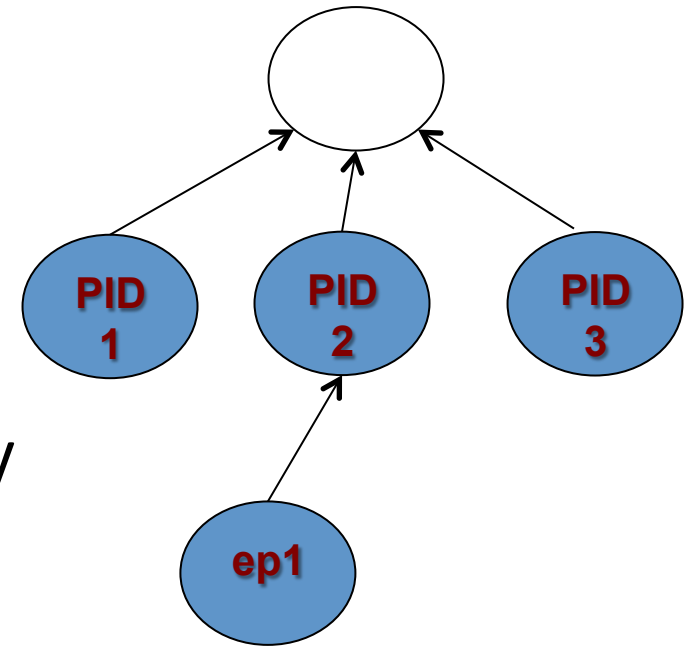
PID Property Inheritance

- Insight:
 - Prefixes (CIDRs) are single-parent
- Approach:
 - A PID *inherits* property P iff all prefixes in the PID inherit the same value for P
- Preserves useful cases, avoids pathological ones
- Example:
 - Suppose PID-2's CIDRs are covered by PID-0, but not PID-X
 - Then PID-2 inherits properties from PID-0 that are not overridden in PID-1a or PID-1b



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



Thank you.