

# Unified Properties for ALTO Updates

draft-ietf-alto-unified-props-new-11

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# Unified Properties for the ALTO Protocol in a nutshell

- Extends IPv4 and IPv6 endpoints to entities such as IPv4/6, PIDs, ANEs
  - On which properties are conveyed
- Introduces a new information resource and media type
  - (Filtered) Property Map
- Used by several ALTO Services
  - Standalone entity property service
  - In multi-part Path-Vector Cost Map Server response
  - In CDNI-FCI footprint capabilities
- Entity Property Service handles information resource dependent entities and properties, which requires
  - Careful design for resource-dependent entities and properties
  - Unambiguous mapping of properties to applicable entities
  - Unambiguous mapping of entities, properties to applicable information resources
- Long-lasting design and specification work

# Overview of Unified Properties updates – v11

- V11 submitted in March 09 2020
- Changes to simplify and clarify text
  - Sections 1, 2, 3, that present the new features
- Section 3.4 - Hierarchy and Inheritance rules
- Section 5
  - Some text added on inheritance rules in “ipv6” and “ipv4” entity domain
- Section 6: some text and reference to ALTO-CDNI
- New text relating to draft-ietf-alto-path-vector-10
  - 10.3 Properties for Abstract Network Elements: introduced example
  - 10.4 IRD: added example "path-vector-map"
  - Section 10.10: multi-part Server response including property map
- No changes in the design
- Further explanations, clean-up and clarifications needed before WGLC call
- **New revision 12 in progress with major changes**

# Version 12 – in progress

- Section 2 – high level - done
  - Further clarification on terminology the new concepts
- Section 3 – high-level -done
  - Further motivation and explanations for advanced concepts
- Section 6
  - Text will be dropped or moved to IANA Section 12
  - "Entity Domain Types exposed by ALTO Information Resources"
    - Instead of "Resource-specific entity domain export"
- Sections 4, 5, 8, 9 – normative
  - Will be clarified and harmonized
- Section 10
  - Will have more generic text for path-vector example
  - Will have case with properties queried on ANEs with persistent ID
- Section 12 – IANA
  - Will have additional text on entity domain type registration

# V12 – Section 2 - updates

## Basic features of the UP extension – clarifications

- An entity domain is characterized by its *type* and identified by its *name*
- New section: 2.2.1. Entity Domain **Type**
  - Generic → IANA registration
- New section: 2.2.2. Entity Domain **Name**
  - ALTO Server scope
  - Shows how entities in a domain can resource-dependent
    - in which case ED type and ED name must be different
- 2.3. Entity Property **Type**
  - Generic → IANA registration
  - Some identifiers may designate both an entity type and a property type
    - Example = “pid”

# V12 – Section 3 - updates

## Advanced Features of the Unified Property Extension

- **3.1 Entity Identifier and Entity Domain Name**
  - In this document, an entity must be owned by exactly one entity domain (ED) name
  - An entity identifier must point to exactly one entity
  - ➔ Entity identifier must be explicitly attached to ED name
    - Domain-name o entityID
- **3.2 Resource-Specific Entity Domain Name**
  - Further explanations and illustrations
  - When an entity is defined wrt an information resource IR,
    - for example: a mypid10 is defined in netmap2
  - ➔ ED name for this entity must associate the relative resource id and ED type
    - resourceID o domain-type,
  - Example: netmap2.pid

## V12 – Section 3 - updates

# Advanced Features of the Unified Property Extension

- 3.3. Resource-Specific Entity Property
  - Further explanations and illustrations
  - Same approach as in RFC 7285: property name associated with ID of relative IR
- 3.5. Applicable Entity Domains and Properties in the Property Map Capabilities
  - Key feature: allows a client to know what properties can be queried on an Entity Domain
  - Points to sections documenting authorized combinations of information resources with entity domains and properties
  - Goal: a client should ignore irrelevant combinations exposed by a server
  - To be Clarified, restructured

# V12 – Section 3 - updates

## Advanced Features of the Unified Property Extension

- 3.4 Entity Hierarchy and Property Inheritance
  - **Applies to entity domain types where** entities can be grouped in and identified by sets
    - Example address blocks in the “ipv4” domain
    - Property values are defined for set ID instead of for individual entities
    - Allows substantial savings in payload
  - Some sets obey strict inclusion rules or order relations.
    - Properties and values can be inherited
    - Additional payload savings
  - Requires to define rules for: Entity Hierarchy, Property Inheritance and Property Value Unicity
- 3.4 Substantial updates
  - Reformulated context, explained, illustrated
  - Added a subsection for Entity Hierarchy, Property Inheritance
  - New section 3.4.3. Property Value Unicity
    - Why needed and CIDR example

## V12 – Section 3 – in progress

# Advanced Features of the Unified Property Extension

- 3.6. Connection between Resource-Specific Entity Domain/Entity Property Mapping and Information Resources – **in progress**
- This section stresses the need to inform a Client on
  - What type of ED it can get can from an information resource type
  - That is: what type of ED can be exposed by a given type of IR
    - Example 1: netmap1.pid is OK
    - Example 2: netmap1.ane is NOT OK
- It will explain how this needs to be documented
  - Along with the definition of entity domain
  - In the relevant documents introducing new entity domain types.
- It will cite ED type “ipv4”, “ipv6”, “pid” and point to sections defining these domains
- Text of 3.6 on IANA registries will be removed

# v12 in progress – IANA Considerations

- 12.2 ALTO Entity Domain Type Registry
  - 12.2.2. ALTO Entity Domain Type Registration Process
    - New information item: “Compatible Types of Exporting ALTO Information Resources”  
Telling the need to list the type of ALTO information resources that can expose the Entity Domain and be combined with an entity domain identifier. The list MUST be provided in the document defining the Entity Domain Type.
- 12.3 ALTO Entity Property Type Registry
  - New entry: identifier “priv:” with Intended Semantics = Private use

# Thank you

Back-up slides follow

# Section 2. Basic features of UP extension

- Defines “generic” features as in early versions
- Added introduction with purpose of UP extension
  - convey properties on objects that extend ALTO Endpoints and are called ALTO Entities
- 2.1 Entity
  - Generalizes Endpoints
  - Examples: endpoints, PID, ANE, ...
- 2.2 Entity domain
  - Set of entities of same type = type of entity domain
  - Defines entity ID format
  - Example “ipv4”, “pid”
- 2.4 Entity property
  - Can be network-aware (AS Number) or network-agnostic (geographical region)
- 2.5 New information resource and media type: ALTO Property Map
  - GET-mode or POST mode

## Section 3. Advanced features for UP extension

- 3.5 Applicable Entity Domains and Properties in the Property Map Capabilities

- To expose to clients what properties can be queried on what entities
- Ambiguity issue in previous design

```
"uses" : [ "netmap1", "netmap2", "cdnifci-map-4" ]
"capabilities" : {
    "entity-domain-types" : [ "ipv4", "countrycode", "asn" ],
    "prop-types" : [ "cdni-fci-capabilities", "pid" ]
}
```

**Problem:** querying "pid" property on "countrycode" or "asn" entity is not allowed

- **Solution:** (example added in v11)

- for each entity domain, expose list of applicable properties in capabilities

```
"mappings": {
  "ipv4": [ "netmap1.pid", "netmap2.pid", "cdnifci-map-4. cdni-fci-capabilities" ],
  "countrycode": [ "cdnifci-map-4. cdni-fci-capabilities" ],
  "asn" : [ "cdnifci-map-4. cdni-fci-capabilities" ]
}
```