ALTO Extension: Path Vector

draft-ietf-alto-path-vector-02

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Overview

- Document goal: address the network graph milestone

- Main updates between IETF99 and IETF100
  - Text re-organization
  - Clarification on words
  - Remove "query-id"
  - New media type introduces a new service
  - move ANE Domain to [draft-ietf-alto-unified-props-new]

Recall: Three Solutions Proposed at IETF99

- PV Cost Type --- Stable
  - Cost Mode = "array"

    Indicate each returned cost value is an array
  - Cost Metric = "ane-path"

    Indicate each returned array represents an path consisting of abstract network elements
- Information Structure --- Changed
  - Path Vector information in cost map and property map
  - " Query-id" is used to correlate two maps.
  - Introduce "mutipart/related" to return two maps in a single response
- Query Format --- Stable
  - Cross-product format as defined in [RFC7285]

Update 1: Text Re-Organization

Update 2: Clarification on Words

- Use Key Words MUST, MAY, SHOULD... clearly as defined [RFC2119]
- Consistent use of the abbreviations defined in terminology
- Replace the references of [I-D.ietf-alto-multi-cost] to [RFC8189]

Update 2: Clarification on Words

- Words underline that cost metric "ane-path" can only be in cost mode "array" defined in this document and the table enriched to illustrate the restriction.

cost mode	cost metric	meaning
numerical	routingcost	a number representing the routing cost
ordinal array	hopcount ane-path	a ranking representing the hop count a list representing the ane path

Table 1: Cost Types and Their Meanings

cost mode	cost metric	meaning
numerical	routingcost	a number representing the routing cost
numerical	hopcount	a number representing the hop count
ordinal	routingcost	a ranking representing the routing cost
ordinal array	hopcount ane-path	a ranking representing the hop count a list representing the ane path

Table 1: Cost Types and Their Meanings

Update 3: Remove "query-id"

- “query-id” correlates the abstract network elements in a Filtered Cost Map(Endpoint Cost Service) and a Filtered Property Map, but is inconvenient. Additional attribute in the response of unified property map and cost maps.

- ALTO Server need to ensure the uniqueness of abstract network elements in a period of time.

Update 4: A New Service "Multipart ALTO Service"

- Media Type : multipart/related
- HTTP Method: POST
- Accept Input Parameters:
  - The same as Filtered Cost or Endpoint Cost Service
- Uses:
  - Filtered Cost Map or Endpoint Cost Service
- Response:
  - Encode a Cost Map and a Unified Property Map in a single response

  OR
  - Encode a Endpoint Cost Map and a Unified Map in a single response

Request

POST /multipartservice/ecs-property HTTP/1.1

Host: alto.example.com

Accept: multipart/related, application/alto-costmap+json, application/alto-propmap+json, application/alto-error+json

Content-Length: [TBD]

Content-Type: application/alto-costmapfilter+json

```
{
   "multi-cost-types": [
      { "cost-mode": "…",
        "cost-metric": "…" },
      { "cost-mode": "numerical",
        "cost-metric": "routingcost" } ],
   "endpoints": {
      "srcs": [ "ipv4:192.0.2.2" ],
      "dsts": [ "ipv4:192.0.2.89",
                "ipv4:203.0.113.45",
                "ipv6:2001:db8::10" ]
   }
}
```

Response

HTTP/1.1 200 OK

Content-Length: [TBD]

Content-Type: multipart/related; boundary=example-2

--example-2

Content-Type: application/alto-endpointcost+json

```
{
   "meta": {
      "multi-cost-types": [...]
      "vtag": {
         …
         "query-id": "query2"
      }
   },
   "endpoint-cost-map" : …
```

--example-2

Content-Type: application/alto-propmap+json

```
{
   "property-map" : …
}
```

--example-2--

Update 5: Move ANE Domain to Unified Property Map

- Instead of specifying the format of ANE Domain in detail with "Domain Name", "Domain-Specific Entity Addresses", this document uses the same definition of entity domain name ane as defined in Section 3.4 of [I-D.ietf-alto-unified-props-new]

Next Steps

- Refinement of the use case is in progress

  Great thanks to Sabine's fruitful review
- SSE support for Multipart ALTO Service to be discussed
- Collect feedback

Q & A

Thanks

Request

POST /endpointcostmap/multicost HTTP/1.1

Host: alto.example.com

Accept: multipart/related, application/alto-costmap+json, application/alto-propmap+json, application/alto-error+json

Content-Length: [TBD]

Content-Type: application/alto-costmapfilter+json

```
{
   "multi-cost-types": [
      { "cost-mode": "…",
        "cost-metric": "…" },
      { "cost-mode": "numerical",
        "cost-metric": "routingcost" } ],
   "endpoints": {
      "srcs": [ "ipv4:192.0.2.2" ],
      "dsts": [ "ipv4:192.0.2.89",
                "ipv4:203.0.113.45",
                "ipv6:2001:db8::10" ]
   }
}
```

Response

HTTP/1.1 200 OK

Content-Length: [TBD]

Content-Type: multipart/related; boundary=example-2

--example-2

Content-Type: application/alto-endpointcost+json

```
{
   "meta": {
      "multi-cost-types": [...]
      "vtag": {
         …
         "query-id": "query2"
      }
   },
   "endpoint-cost-map" : …
```

--example-2

Content-Type: application/alto-propmap+json

```
{
   "property-map" : …
}
```

--example-2--

Protocol Specifications

- VersionTag Extension

```
object {
        ResourceID resource-id;
        JSONString tag;
        [JSONString query-id;]
} VersionTag;
```

- IRDResourceEntry Extension

```
object {
        JSONString uri;
        …
        [ResourceID uses<0..*>;]
        [ResourceID property-map;]
} IRDResourceEntry;
```

- Cost Map/ Endpoint Cost Map Extension
  - **Response**

1. The "vtag" field MUST be included in the "meta" filed of the response.
2. The encoding format of each map maintains the same but introduce a new media type multipart/related to encode the multiple resources in a single response.

- Property Map
  - **Accept Input Parameters of IRDResourceEntry**

```
object {
        EntityAddr entities<1..*>
        PropertyName properties<1..*>;
        [JSONString query-id;]
} ReqFilteredPropertyMap;
```