ALTO Protocol

draft-penno-alto-protocol-04

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Grateful to contributions from large number of collaborators;
see draft for complete list.
Outline

- Changes from -03 to -04
- New Protocol Structure
- Next Steps
Comments since -03

-03 version represented merge of a number of proposals
  - Many commonalities amongst proposals
  - Merge process attempted to unify many concepts

Much helpful feedback from IETF75 and mailing list

Primary issues identified:
  - Overall architecture unclear
    - Not clear why merge was reasonable
    - Too complicated
  - Dislike of XML encoding
  - Details of HTTP usage (e.g., caching headers)
Changes in −04: Protocol Structure

- Split operations into services
  - Service includes operations of related functionality
  - Simplifies distinction between REQUIRED and OPTIONAL behavior

- Allow for extremely simple basic deployment
  - Minimal set of services are REQUIRED
  - Implementable by serving static files from a web server

- Retain flexibility for diverse deployment scenarios
  - Additional OPTIONAL services extend core services
Changes in -04: Encoding

- Focus of -04 is on overall protocol structure and operations
  - (Temporarily) removed specific encodings from document
  - Examples indicate information contained in messages

- Fully specify encoding once structure (mostly) stabilized
Protocol Structure

ALTO Services

- Map Filtering Service
- Endpoint Property Service
- Ranking Service

Map Service
- Network Map
- Cost Map

Server Capability

KEY:
- REQUIRED
- OPTIONAL
Map Service: Basic ALTO Information Recap

**Example Network Map**

| NetLoc: PID1 | 128.36.0.0/16 | Endpoint: 128.36.9.8 |
| NetLoc: PID2 | ... |
| NetLoc: PID3 | 130.132.0.0/16 | Endpoint: 130.132.10.5 |

**Network Location:**
Denotes endpoint or group of endpoints

**PID:**
Provider-defined identifier for group of endpoints

**Example Cost Map**

<table>
<thead>
<tr>
<th>Type: Routing Cost</th>
<th>Mode: Numerical</th>
</tr>
</thead>
<tbody>
<tr>
<td>PID1</td>
<td>PID2</td>
</tr>
<tr>
<td>PID1</td>
<td>1</td>
</tr>
<tr>
<td>PID2</td>
<td>10</td>
</tr>
<tr>
<td>PID3</td>
<td>15</td>
</tr>
</tbody>
</table>

**Cost Type:**
Indicates what the cost represents (e.g., routing cost, air-miles, hop-count, etc)

**Cost Mode:**
Indicates how cost is interpreted; either *numerical* or *ordinal*
Server Capability

Purpose

- Indicates options supported by the server
  - Supported services, cost metrics, etc

Operations

Get Capabilities

Request:

```
GET /capability
```

Response:

- Server name
- Supported services
- Supported cost metrics
Map Service

Purpose

- Provides batch information to ALTO Clients
  - Network Map and Cost Map
  - Based on provider-defined groupings (PIDs)

Operations

**Get Network Map**
Request:
```
GET /prop/pid/map
```
Response:
List of PIDs (and IP Prefixes within each)

**Get Cost Map**
Request:
```
GET /cost/pid/map
```
Response:
Cost Type
Cost Mode
Cost between each pair of PIDs
Map Filtering Service

- **Purpose**
  - Provides ALTO Information based on additional parameters
  - Server-side filtering for resource-constrained ALTO Clients

- **Operations**
  
  **Get Network Map**
  
  **Request:**
  
  POST /prop/pid/filter
  
  List of PIDs

  **Response:**
  
  List of PIDs (and IP Prefixes within each)

  **Get Cost Map**
  
  **Request:**
  
  POST /cost/pid/filter
  
  Cost type, mode, and constraints
  List of source PIDs
  List of destination PIDs

  **Response:**
  
  Cost Type
  Cost Mode
  Cost between each pair of source/destination PID
Endpoint Property Service

Purpose

- Allows ALTO Clients to look up properties for individual endpoints
  - PID property indicates provider-defined grouping of an Endpoint

Operations

Get Endpoint Property

Request:

```
POST /endpoint/m
```

List of Endpoints
List of Properties

Response:

List of Endpoints (and property values for each)
Ranking Service

Purpose

- Provide path costs based on other types of network locations
- Currently defines path costs amongst individual Endpoints

Operations

Get Endpoint Ranking

Request:

POST /cost/endpoint/ranking

Cost type, mode, and constraints
List of source Endpoints
List of destination Endpoints

Response:

Cost Type
Cost Mode
Cost between each pair of
source/destination Endpoints

Ordinal Ranking Response Example:

```
{
    "Type": "routingcost",
    "Mode": "ordinal",
    "Ranking" : {
        "ipv4:128.30.24.2": {
            "ipv4:128.30.24.89" : 1,
            "ipv4:130.132.33.4" : 2,
            "ipv4:12.32.67.3"   : 3
        }
    }
}
```
Next Steps

- Issues for working group to address
  - Naming of services ("Map Service" → "ALTO-Core"?)
  - Details of HTTP usage (caching, error codes, etc)
  - Encoding specification (grammar)

- Adopt as working group item?