# ALTO Protocol

## draft-ietf-alto-protocol-04

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

# Outline

- REST-ful vs REST-like
- Summary of changes since -03 draft
- Possible Extensions for Discussion
- Other comments?

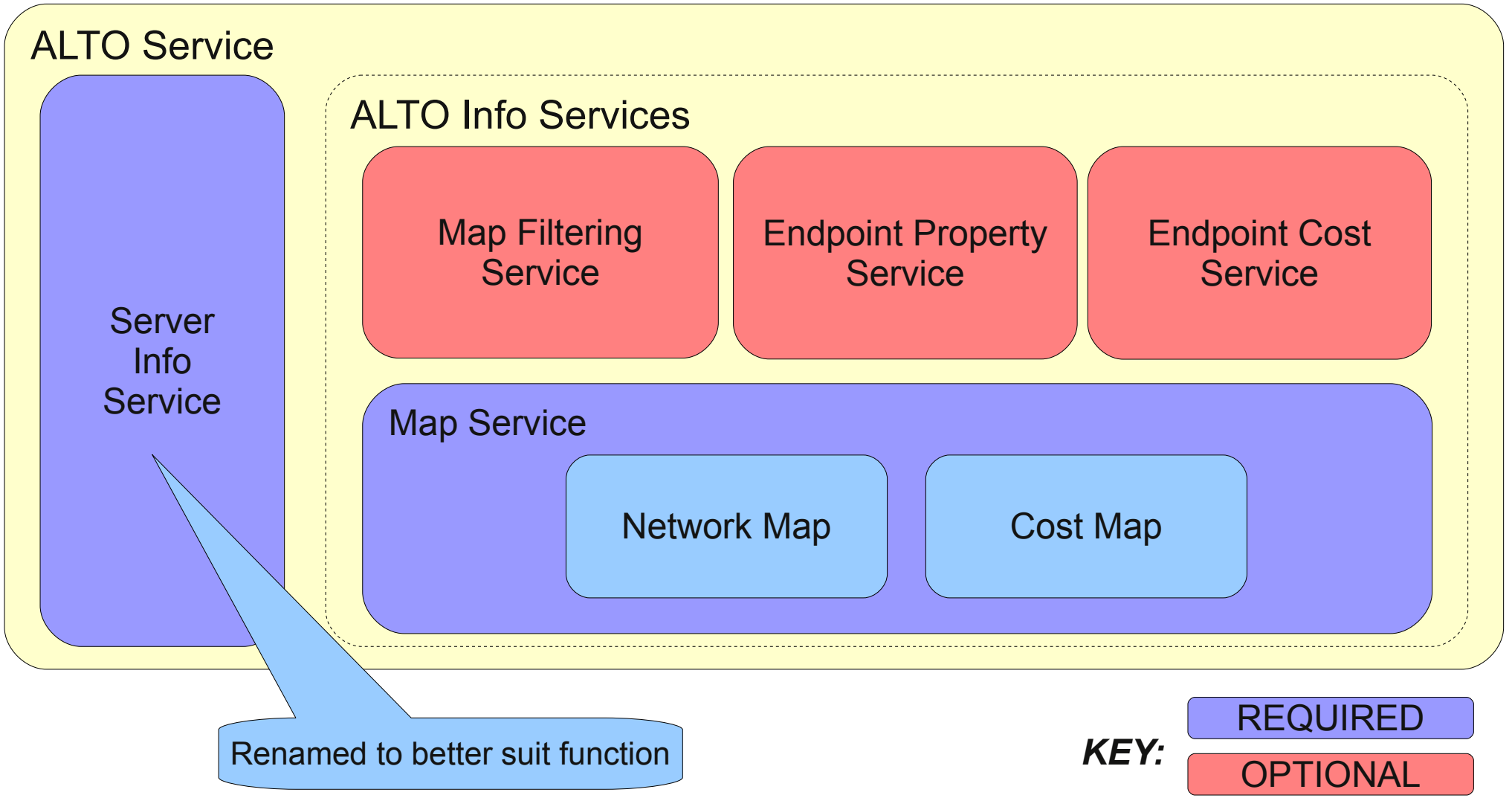
# REST-ful vs. REST-like

- Martin Thomson discussed fully REST-ful approach at IETF77
  - One primary suggestion is single document (e.g., “/.well-known/alto”) with server-defined URLs for available services
- `draft-penno-alto-protocol-01` had “Interface Descriptor”
  - Index of server-defined URLs for available services
  - Received feedback that such an indirection wasn't necessary
- Haven't seen any movement from WG to adopt fully REST-ful design
  - Updated draft to avoid term “REST-ful”
  - Discussion?

# Change Summary: Server Info

- "Server Capability" → "Server Info Service"
  - Previously both queries coupled into one
    - Problematic for protocol evolution
      - List query to discover version numbers should be simple and minimal
    - More difficult to maintain consistent capability information across server
      - Example: enabling Endpoint Cost Service on one server involved updating config information at other servers
  - New draft decouples into two queries
    - List Servers: `GET /info/servers`
      - Returns URLs and version numbers of available servers
    - Server Capability: `GET /info/capability`
      - Returns capability information for server itself

# Protocol Structure



# Server Info Service Examples

- Server List

```
GET /info/servers HTTP/1.1
Host: alto.example.com:6671


HTTP/1.1 200 OK
Content-Length: ...
Content-Type: application/alto

{
  "meta" : {
    "version" : 1,
    "status" : { "code" : 1 }
  },

  "type" : "server-list",

  "data" : {
    "servers" : [
      {
        "uri": ”http://alto.example.com:6671",
        "version" : 1
      }
    ]
  }
}
```

- Server Capability

```
GET /info/capability HTTP/1.1
Host: alto.example.com:6671


HTTP/1.1 200 OK
Content-Length: ...
Content-Type: application/alto

{
  "meta" : {
    "version" : 1,
    "status" : { "code" : 1 }
  },

  "type" : "capability",

  "data" : {
    "services" : [ "map", "map-filtering" ],
    "cost_types": [
      "routingcost",
      "hopcount"
    ],
    "cost_constraints": false
  }
}
```

# Change Summary: Status Codes

- ALTO Status Codes
  - Decoupled application-layer status codes from HTTP status codes
    - Allows meaningful status codes related to ALTO messages
    - Full list of error codes needs to be filled in
      - Suspect it will see more error codes added as implementations surface...
  - Appropriate HTTP Status codes will be used to handle intermediaries
  - Discussion
    - Symbolic names (e.g., E_JSON_SYNTAX) or integers?
      - Names easier to debug and we use text encoding anyways
    - Need to support multiple error codes per message?

# Change Summary: Service ID

- Example of Problem
  - Two ALTO Servers $S_A$ and $S_B$ deployed for load balancing / redundancy
  - ALTO Client $C_A$ maps to $S_A$ via discovery and retrieves maps
  - ALTO Client $C_B$ maps to $S_B$ via discovery
  - *$C_A$ should be able to redistribute maps to $C_B$*
- Service ID
  - UUID identifying “equivalent” ALTO Servers for purpose of redistribution
  - Servers with same Service ID use same private key for digital sigs
- Discussion
  - Is this mechanism needed?
  - Need to explore security considerations more completely

# Change Summary: Misc

- Short discussion section for IPv4 / IPv6 issues
  - Detailed draft and WG discussion later on the interim meeting agenda …

# Possible Extensions: Intra-ISP PIDs

- We see good performance for “location-only” peer selection algorithm
  - Overview of algorithm to select 50 peers
    - Select up to *α*50* total peers at random from same PID
    - Select up to *β*50* total peers at random from same ISP (intra-ISP PIDs)
    - Select remaining peers from external PIDs
  - Experiment Setup
    - 2790 PPLive (emulated) clients running on PlanetLab
  - Results for North American ISP
    - 31.6% increase in intra-ISP traffic, 117.8% increase in intra-PID traffic
    - 6% reduction in average startup delay, 51% reduction in # of freezes
- Observations for ALTO Protocol and Discussion
  - Provides simple integration path for applications wishing to utilize ALTO
  - Needs attribute indicating which PIDs are intra-ISP

- Any other comments or feedback?