ALTO Cost Schedule

draft-randriamasy-alto-cost-schedule-02
diffs since version 00

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ALTO Cost Schedule

- Extends ALTO Cost values in time horizon
  - Specifies time slots (hourly slots) over a period of time (24 slots)
- New Cost Mode = **`schedule„`**
- Cost Mode attributes

New

```
"cost-scope": [{"unit": ["hour", 1], "size": 24,
                "begin": 0, "time zone": „UTC",
                "lastupdate": mm/hh/dd/mm/yyyy,
               "nextupdate": mm/hh/dd/mm/yyyy} ]
```

- ALTO cost values in Schedule mode can be used
  - As historic or predictive information to estimate the expected QoE
  - To accordingly schedule transfers or access to application resources (contents, services...).
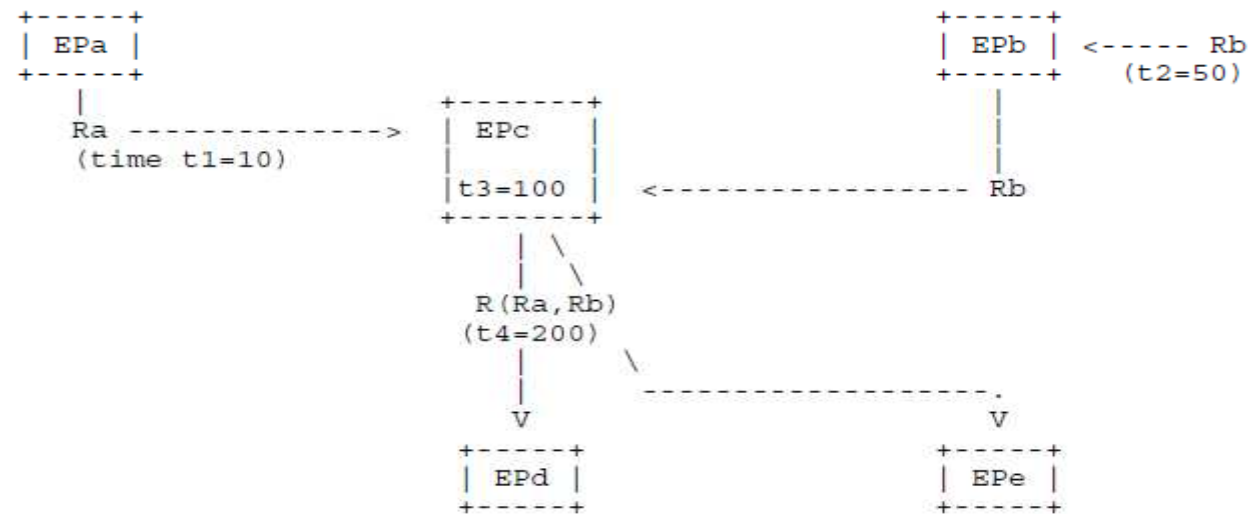 - To schedule ALTO requests, since the value change frequency in known

Use cases

- Applicable ALTO Services
  - Endpoint cost service
  - Filtered cost map of "affordable" size

- ALTO Cost Schedule is meant for non-real time applications that have a degree of freedom on *when* to "use a resource",
  - Resource = content in a CDN, computation resource in a DC
  - "use a resource" includes
    - data transfer between caches,
    - access a service,
    - use a physical server for a virtualized application,
    - download content

Diff1 – use case section 2.2

- End systems with connectivity or access to datacenters that is *variable* and *predictable*
  - Applications: remote learning, enterprise database update, remote distributed computation, …
  - ➔ Wish to schedule their connection to application Endpoints

Example: scattered endpoints/resources

➔ Interaction with Endpoints can be scheduled at times with the best possible ALTO Cost value

```
+------+                                           +------+
| EPa  |                                           | EPb  | <----- Rb
+------+                                           +------+    (t2=50)
   |                    +--------+                     |
   Ra -------------->   | EPc    |                     |
   (time t1=10)         |        |                     |
                        |t3=100  | <----------------- Rb
                        +--------+
                           | \
                           |  \
                        R(Ra,Rb)
                        (t4=200)
                           |    \
                           |     \ ----------------.
                           V                        V
                        +------+                  +------+
                        | EPd  |                  | EPe  |
                        +------+                  +------+
```

- ALTO Client themselves can schedule their requests
  - Know *when* noticeable ALTO values may occur

Diff2 – § 2.3 SDN Controller guided access to application endpoints (new)

- Base ALTO protocol allows to perform SDN primitives
  - Abstraction, Get Network Topology, Get device capabilities
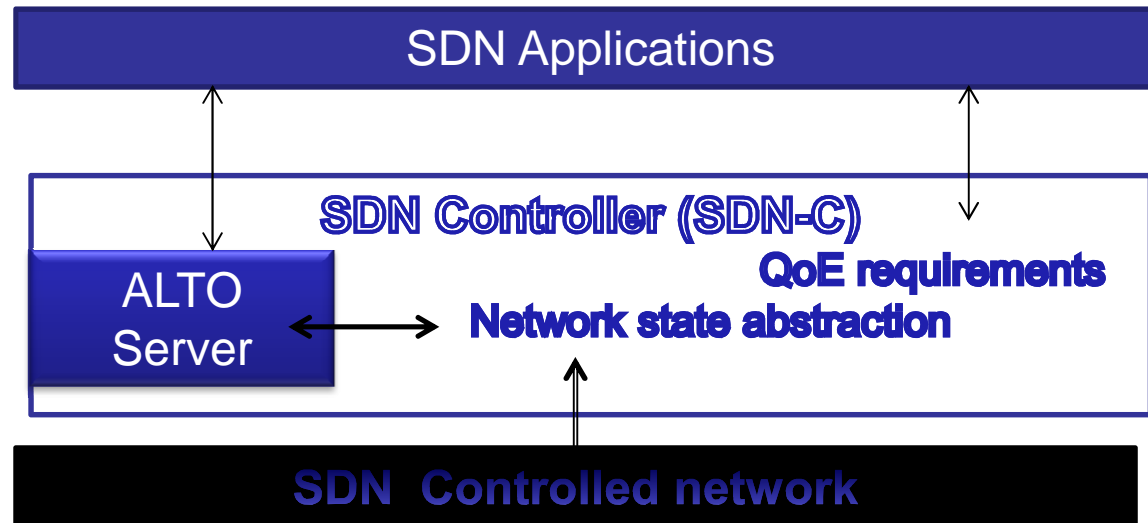
- – SDN primitive "Get network resources"
  - Provides applications with informations to evaluate QoE
  - Abstracting e.g. delay, bandwidth ➔ requires new ALTO Cost Types

Diff2 – § 2.3 SDN Controller guided access to application endpoints (new)

- SDN-C can use ALTO Cost Schedule to influence the scheduling of application traffic
  - Get network state history
  - Derive *estimation/prediction* over given time frames
  - Store their abstraction in ALTO server
  - Give the values to SDN applications via the ALTO ECS

➡ Applications get a better QoE as they pick the best time

➡ SDN-C improves load balancing as it may
  - guide application traffic to selected Endpoints
  - AND indirectly distribute application traffic over time via carefully specified ALTO cost Schedule values

Thank You

- Back-up slides

Example

- Request:

```
POST /endpointcost/lookup HTTP/1.1
Content-Type: application/alto-endpointcostparams+json
{ "cost-type" : ["pathoccupationcost"],
  "cost-mode" : ["schedule"] }
```

- Response:

```
HTTP/1.1 200 OK
Content-Type: application/alto-endpointcost+json
{ "meta" : {},
  "data" : { "cost-type" : ["pathoccupationcost"],
             "cost-mode" : ["schedule"],
             "map" : { "ipv4:192.0.2.2":
                     { "ipv4:192.0.2.89" : [7, ... 24 values],
                       "ipv4:198.51.100.34" : [4, ... 24 values],
                       "ipv4:203.0.113.45" : [2, ... 24 values] }
    } } }
```