Updates since -v04

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ALTO Cost Calendar in a nutshell

- Target WG work item: cost extensions (May 2015)
- ALTO Calendar
  - Array of time-dependent cost values for a given metric
  - Set of attributes describing time scope of the calendar
- Delay tolerant applications can schedule their connections
  - Optimal time for data transfers
- ALTO Clients can schedule their Calendar requests
  - ALTO servers may save transactions on repeated value arrays
- Applicable to
  - Time-sensitive ALTO metrics
  - Filtered Cost Map (FCM)
    - for full Cost Map: use empty SRC & DEST
  - Endpoint Cost Map (ECM)
ALTO Calendar design

- Backwards compatibility with legacy Clients and Multi-Cost Map
  - Calendars associated to ALTO information resources
  - Calendar attributes specified in
    - IRD information resources of IRD
    - "meta" member of ALTO Server responses
- Does not introduce a new mode
- Does not introduce new media types
- Compatible with all cost-modes
Updates in v05

- IRD updates
  - Removed IRD resources attributes on repeated value arrays: "start-mode" and "repeat-indication"
- Instead: ALTO Server responses for FCM and ECM
  - may optionally use attribute "repeated"
    - When ALTO value arrays are repeated
    - To avoid serving requests on unchanged values

- 3 RULES to be included on Calendar information updates
  - RULE 1: Calendar start and duration VS request date
  - RULE 2: “HTTP Last-Modified” VS Calendar start and duration
  - RULE 3: “HTTP Last-Modified” VS Calendar start and duration
    - for repeated values
"endpoint-cost-calendar-map" : {
    "uri" : "http://custom.alto.example.com/calendar/endpointcost/calendar/lookup",
    "media-types" : [ "application/alto-endpointcost+json" ],
    "accepts" : [ "application/alto-endpointcostparams+json" ],
    "capabilities" : {
        "cost-constraints" : true,
        "cost-type-names" : [ "num-routingcost", "num-latency",
                                "num-pathbandwidth", "string-service-status" ],
        "calendar-attributes" : [ {
                                    "cost-type-names" : "num-routingcost",
                                    "time-interval-size" : "1 hour",
                                    "number-of-intervals" : 24
                                },
                               ...
                                {
                                    "cost-type-names" : "string-service-status",
                                    "time-interval-size" : "2 minute",
                                    "number-of-intervals" : 30
                                },
                                ]
    },
    "uses" : [ "my-default-network-map" ]
} // ECM capab
ALTO Calendar v05- example ECM - § 4.2.3

POST /calendar/endpointcost/lookup HTTP/1.1
Host: alto.example.com  Content-Length: [TODO]
Content-Type: application/alto-endpointcostparams+json
Accept: application/alto-endpointcost+json,application/alto-error+json

```json
{
  "cost-type" : {
    "cost-mode" : "numerical",
    "cost-metric" : "routingcost"
  },
  "calendared" : [true],
  "endpoints" : {
    "srcs" : [ "ipv4:192.0.2.2" ],
    "dsts" : [ "ipv4:192.0.2.89",
               "ipv4:198.51.100.34",
               "ipv4:203.0.113.45" ]
  }
}
```
HTTP/1.1 200 OK
Content-Length: [TODO]
Content-Type: application/alto-endpointcost+json

{
    "meta": {
        "cost-type": {"cost-mode": "numerical", "cost-metric": "routingcost"},
        "calendar-response-attributes": [
            { "calendar-start-time": "Mon, 30 Jun 2014 00:00:00 GMT",
              "time-interval-size": "1 hour",
              "numb-intervals": 24,
              "repeated": 4
            }, //same value array for Monday, Tuesday, Wednesday, Thursday
        ] // end meta
    
    "endpoint-cost-map": {
        "ipv4:192.0.2.2": {
            "ipv4:192.0.2.89": [v1, v2, ... v24],
            "ipv4:198.51.100.34": [v1, v2, ... v24],
            "ipv4:203.0.113.45": [v1, v2, ... v24]
        }
    }
}
Next steps

- Request adoption as WG item
Thank you

Back-up follows
Updates on FCM and ECS specifications

- FCM and ECS request must add 1 input parameter
  - JSONBoolean calendared<1..*> 
    - //list size = number of requested cost types

- FCM and ECS responses have 1 additional field in « meta »
  - CalendarResponseAttributes calendar-response-attributes <1..*>;
    - object{
      - JSONString calendar-start-time;
      - JSONString time-interval-size;
      - JSONNumber number-of-intervals;
      - [JSONNumber repeated;] [OPTIONAL]
        - // for «periodic» calendar-start-time: number of calendar iterations with same values
    }
    - CalendarResponseAttributes;

- Calendared Cost values are JSONArrays of time-dependent JSONValues
Calendar rules

- **RULE 1: Calendar start and duration VS request date**
  an ALTO Server indicating Calendars for a given cost-type in its IRD resources MUST provide one
  - beginning at TS = “calendar-start-time” and
  - with values for a duration DU = ("time-interval-size" * "number-of-intervals")
  - Such that is TR is the date of the client request, TR lies in the interval [TS, TS+DU]

- **RULE 2: “HTTP Last-Modified” VS Calendar start and duration**
  we should not have values HL of “HTTP Last-Modified” such that HL < TS-DU since the design assumes that the Calendar values are updated periodically at intervals equal to DU.
  - If the Server does not provide a Calendar on the next period for a cost-type, it MUST NOT list this Cost-Type in the “cost-type-names” member of calendared IRD resources.

- **RULE 3: “HTTP Last-Modified” VS Calendar start and duration for repeated values**
  IF THE SERVER USES MEMBER “repeated” in its responses and if “repeated” has a value n>1 then we can have HL < TS-DU and RULES 1 and 2 are replaced by RULE 3, see examples of section 4.2.3
  - we MUST have TR is the date of the client request, TR lies in the interval [TS, TS+n*DU]