Multi-Cost ALTO

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S. Randriamasy

Outline

- Extension of ALTO protocol
  - multiple cost types in one ALTO transaction
- Why Multi-Cost ALTO transactions
  - Gain time, save resources, richer endpoint choice
- Proposed protocol extensions
  - Multiple ALTO CostTypes
  - Additional cost and Endpoint attributes
- Proposed additional Properties and Costs

Proposed Extensions

- Endpoint Cost Service with multiple Cost Types
- All Costs Types in one response with vector cost values
- In this case, the ALTO client MUST require the Cost Mode « numerical »
- Proposed additional Cost Types
- Statistical costs with a timeframe
- Scope
  - Application clients of: CDN, P2P, Gaming, …
  - ALTO services:
    - Endpoint Cost Service, Cost Map, Filtered Cost Map

Why Multi-Cost ALTO transactions

- REQ. ARv05-14: "The ALTO client protocol MUST support the usage of several different rating criteria types« .
- vector costs provide a robust and natural input to multi-path connections and getting all costs in one single ALTO transaction saves time, traffic, thus ressources an energy.
- « Long » (TBD) term statistics or empirical ratings on performance oriented information may still be useful for a reliable choice of candidate endpoints.
- Specific ALTO services can be specified for mobile core networks, which have a smaller scale and can afford and take advantage of using network information at a smaller time-scale
- Adding QoE-enabling metrics to the Network Provider established routing cost benefits to both the end users and the Providers.

Proposed protocol extensions

- Impacted ALTO services and features
  - Endpoint (EP) Cost
  - Cost attributes
  - Cost Map between Network Locations
  - Cost Map filtering

Proposed protocol extensions

- Multi-Cost specific attributes
  - "Cost Length" = number of requested Cost Types
  - extension of Cost Type to a vector of N >= 1 values
  - Definition of Cost Type ID supported by acting ALTO server and mapping to Cost Vector components
  - Optional: associated with Cost Vector components
    - Reliability vector
    - Time frame vector
  - Default values
- Rule:
  - when multiple cost types are requested, then the requested Cost Mode MUST be numerical

Proposed additional Properties and Costs

- Additional Endpoint (EP) properties
  - EP capacity in memory
  - EP nominal bandwidth
  - EP access technology
- Scope of ALTO information
  - Time Frame attribute
  - Time To Expire counter
  - Reliability Level

Proposed additional Properties and Costs

- Additional Cost Types
  - Endpoint availability (score)
  - Endpoint reliability (score)
  - Endpoint Load (class[timeframe])
  - Endpoint path robustness (class[timeframe])
- Other…

Illustrative ALTO use case

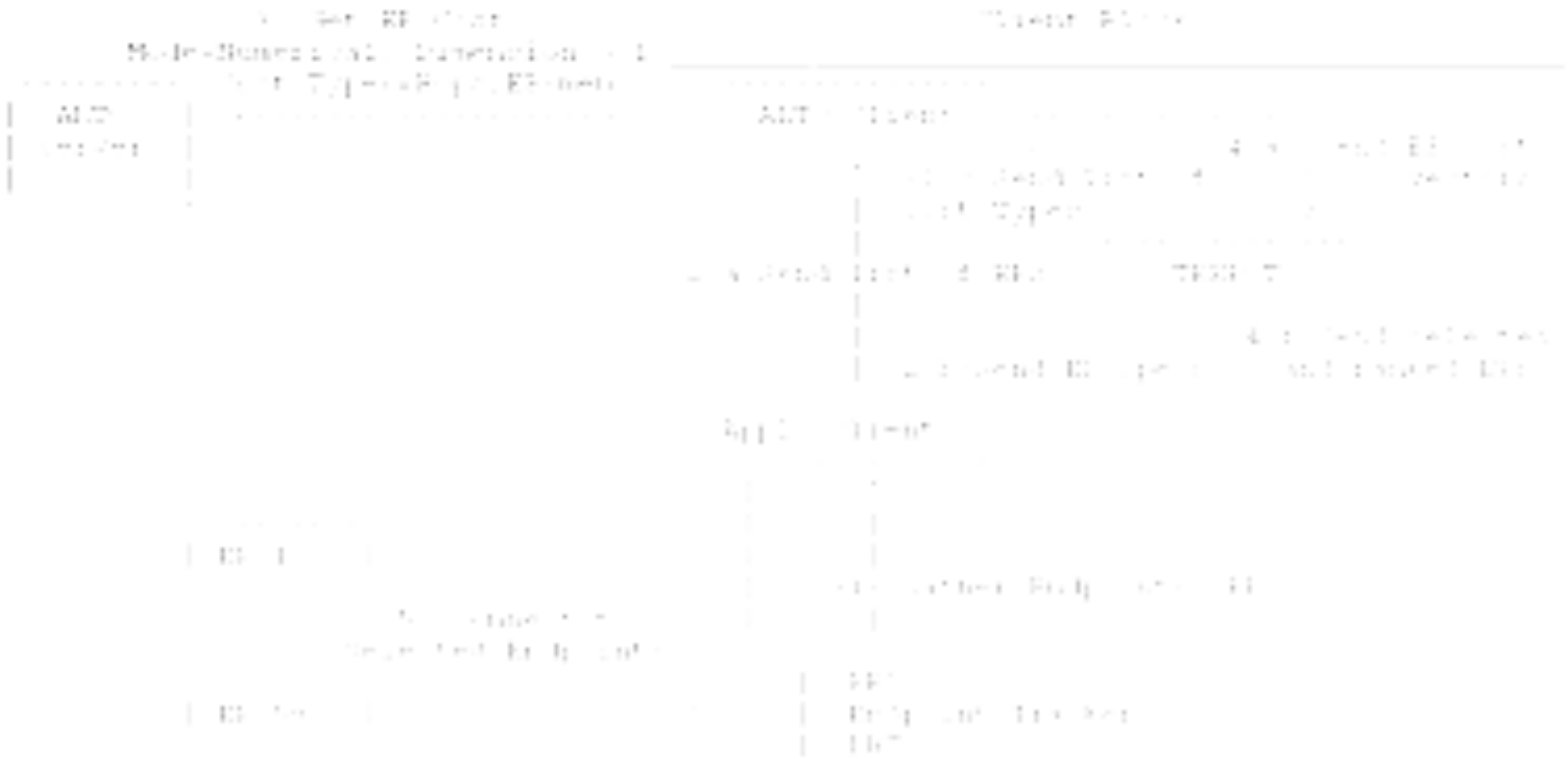

Figure 2: features and mechanisms added to the current ALTO scenario for Multi-Cost ALTO services