draft-randriamasy-alto-cellular-address-02

Updates since V00

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Main motivation for new version v02

- To reflect the WG discussions in particular on consistency between
  - ALTO Address Type (AAT) and
  - ALTO Entity Domain (AED) registries
- Current WG consensus
  - AED registry is considered a superset of the AAT registry
  - "An endpoint MUST be an entity" in IANA subsection 9.2 of [draft-ietf-alto-unified-props-new] (i.e. UP draft)
- Intermediate version 01 submitted in December 15 2017
  - Upon WG discussions
    - Corrected errors in the examples section 3.5
  - Added Section 3.1 "Relation of ALTO Cell Id format to endpoint address format"
    - When a cell mapped to a PID, Cell IDs will be used to specify cells within this PID
    - Cell ID associated to domain "ecgi"

WG discussions and updates in V02

- Updates in V02
  - Expose suitability of proposed "ecgi" domain and address format for both AAT and AED registries and stresses need to enforce consistency between them
  - Placeholder to specify consistency features: Unified Property draft, where updates on IANA considerations is in progress
- New Section 3. "Cell addresses, ALTO Address types and ALTO Entity Domain names"
  - **Motivation**: cells can be either Endpoints on which to query properties and path costs and Entities on which to query (filtered) property maps
  - **Explains** how RFC7285 and draft [draft-ietf-alto-unified-props-new] both provide the background to allow Endpoints and Entities to be cells with well-specified addresses.
  - **Proposes** "ecgi" as ALTO Address type and ALTO Entity Domain name for cells
    - Where "ecgi" relates to the 3gpp term "E-UTRAN Cell Global Identifier"

WG discussions and updates in v02

- Filled Section 6: IANA Considerations upon WG discussions

- "If the ALTO EDR is considered a superset of ALTO ATR, it seems consistent to register only a new Entity Domain named "ecgi". This requires that implementations not willing to use the (Filtered) Property Map Service and related Entities should still be cognizant of the ALTO Domain Entity Registry."

- Should be updated: w.r.t. IANA section 9.2 of UP Draft
  - "When a new address type is registered in the ALTO Address Type Registry [RFC7285], the same identifier MUST be also registered in the ALTO Entity Domain Registry."

Further discussions

- Harmonize with section 9.2 of UP draft
- Placeholder for new address types or entity domains to come
  - AAT registry and AED registry
- In general: how do we collect all the ALTO registry updates?
- Proposal: give a hint in UP draft that should mention examples
  - Current: "ANEs and cells are being specified on other drafts",
  - More general ones

Plans for next version

- Clarify text
  - Discussion only applies only to Entity domains that are also address types

- Complete section 6 on IANA
  - specifying extensions with "ecgi"on the AAT Registry and AED Registry
  - upon [draft-ietf-alto-unified-props-new] progress on consistency between both registries

Thank you

Back-up slides follow

Relevant ALTO work & use cases

- "ALTO Cost Context" using (Filtered) Cost Maps where PIDs can be cells within and among which cost values can be requested, see [draft-randriamasy-alto-cost-context],

- "ALTO Performance Cost Metrics": being defined in [draft-ietf-alto-performance-metrics], they will be extended to performance costs in cellular networks,

- "Extensible Property Maps for the ALTO Protocol", being defined in[draft-roome-alto-unified-props-new] will cover entities that may be cells identified by their addresses. In this document a domain identifier for cells will need to be accordingly defined

- Endpoint property service: extended to allow endpoints to be cells on which properties can be requested,

- ALTO base protocol specified with EP adresses in ipv4 and ipv6 does not preclude other address types
  - See RFC7285, section 2.2 Endpoint Address
  - See also discussion at IETF98

New use cases in PANRG (Path Aware Networking)

- The Internet architecture assumes a division between the end-to-end functionality of the transport layer and the properties of the path between the endpoints. The path is assumed to be invisible, homogeneous, singular, with dynamics solely determined by the connectivity of the endpoints and the Internet control plane

- Increased diversity in access networks, and ubiquitous mobile connectivity, have made this architecture's assumptions about paths less tenable.

- Multipath protocols taking advantage of this mobile connectivity begin to show us a way forward, though: if endpoints cannot control the path, at least they can determine the properties of the path by choosing among paths available to them.

Previous ALTO work and design choice

- "Mobility Network Models in ALTO", [draft-bertz-alto-mobility-nets]
  - propose to identify network points of attachment (PoA) such as cells with PIDs.
  - Requires specifying cell address space and format
- "ALTO in wireless access networks", [draft-rauschenbach-alto-wireless-access]
  - Proposed a format for a cell identifier based on the ECGI specified at 3GPP
  - ECGI = E-UTRAN Cell Global Identifier
- Proposal
  - Use "ECGI" format components proposed in [draft-rauschenbach-alto-wireless-access]

ECGI cell address components

- Endpoint address canonical string format
  - 'ecgi:' MCC '.' MNC ':' ECI
- MCC:
  - Mobile Country Code, as assigned by ITU. A 3 digits decimal number without leading zeros.
- MNC:
  - Mobile Network Code, as assigned by National Authority. A 2-3 digits decimal number without leading zeros.
- ECI:
  - E-UTRAN Cell Identifier. A 7 digits lower-case hex number
- <u>Discussion for future versions</u>: leading zeros

ECGI format – example

- Example: 'ecgi:940.978:1234abc'

- MCC value 940 stands for country or geographical area "Wonderland"

- MNC value 978 stands for Network N1 in Wonderland and other networks in other countries

- A same MNC value, say 020 may be associated with several MCCs.

- Some MCCs have MNCs encoded with 2 digits and MNCs encoded with 3 digits.

- Some MCCs are encoded with '20', some with '020'
    - Shall we keep the leading '0' for direct mapping between 'real' ECGI and ALTO Cell ID?

ALTO Cell Id format

- Address domain = 'ecgi'
- 3 formats
  - 'ecgi:' MCC
  - 'ecgi': MCC '.' MNC
  - 'ecgi:' MCC '.' MNC ':' ECI-MASK '/' MASK-LEN
- MASK-LEN is a decimal number.
- ECI-MASK is a string of lower-case hex digits, of which all but the first MASK-LEN bits are zero.
- Prefix ecgi:P-MCC.P-MNC:P-ECI/N matches ecgi:MCC.MNC:ECI iff
  - MCC == P-MCC, and
  - MNC == P-MNC, and
  - ECI has the same number of hex digits as P-ECI, and the first N bits of ECI match those of P-ECI.

ALTO Cell Id format - example

- Assuming
  - MCC = 940
  - MNC = 978

- ecgi:940
  - Matches every cell address with MCC 940

- ecgi:940.978
  - Matches every cell address with MCC 940 and MNC 978

- ecgi:940.978:1234800/18
  - Matches every cell address with MCC 940, MNC 978, and a 7-digit ECI that starts with the 18 bits 0x12348.

Next steps

- Look at other IETF proposals for cell address format

- Validate address format w.r.t. WG consensus

- Introduce ecgi cell addresses in relevant ALTO documents & services
  - ALTO performance metrics in cellular networks
  - Propose "ecgi" as a cell entity domain identifier for extensible property maps
  - Endpoint properties
  - (Filtered) Cost Maps
  - Endpoint Cost Maps

- Use for re-chartering items

- Thanks to Wendy who initiated this work

Thank you

Back-up follows