



Research Questions

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Motivation for the I-D

- SCION has been in production for years already. Why the research questions?
- We want SCION to scale comfortably to Internet size.
- We want to hear opinions and experiences from all parties.
 - Hardware vendors.
 - ISPs.
 - Software Developers.
- We hope one day to standardize SCION as a PAN.

Overview of the SCION Research Questions I-D

3. Discovery, Distribution, and Trustworthiness of Path Properties

- 3.1. ISD, AS Identity
- 3.2. Beacon Selection Policies
- 3.3. Name Resolution and DNS Service Binding (SVCB)
- 3.4. Segment Dissemination
- 3.5. Periodic Beacon Propagation
- 3.6. Beacon Optimization and Extensibility
- 3.7. DRKey
- 3.8. SCMP Authentication
- 3.9. Proof of Transit
- 3.10. NAT

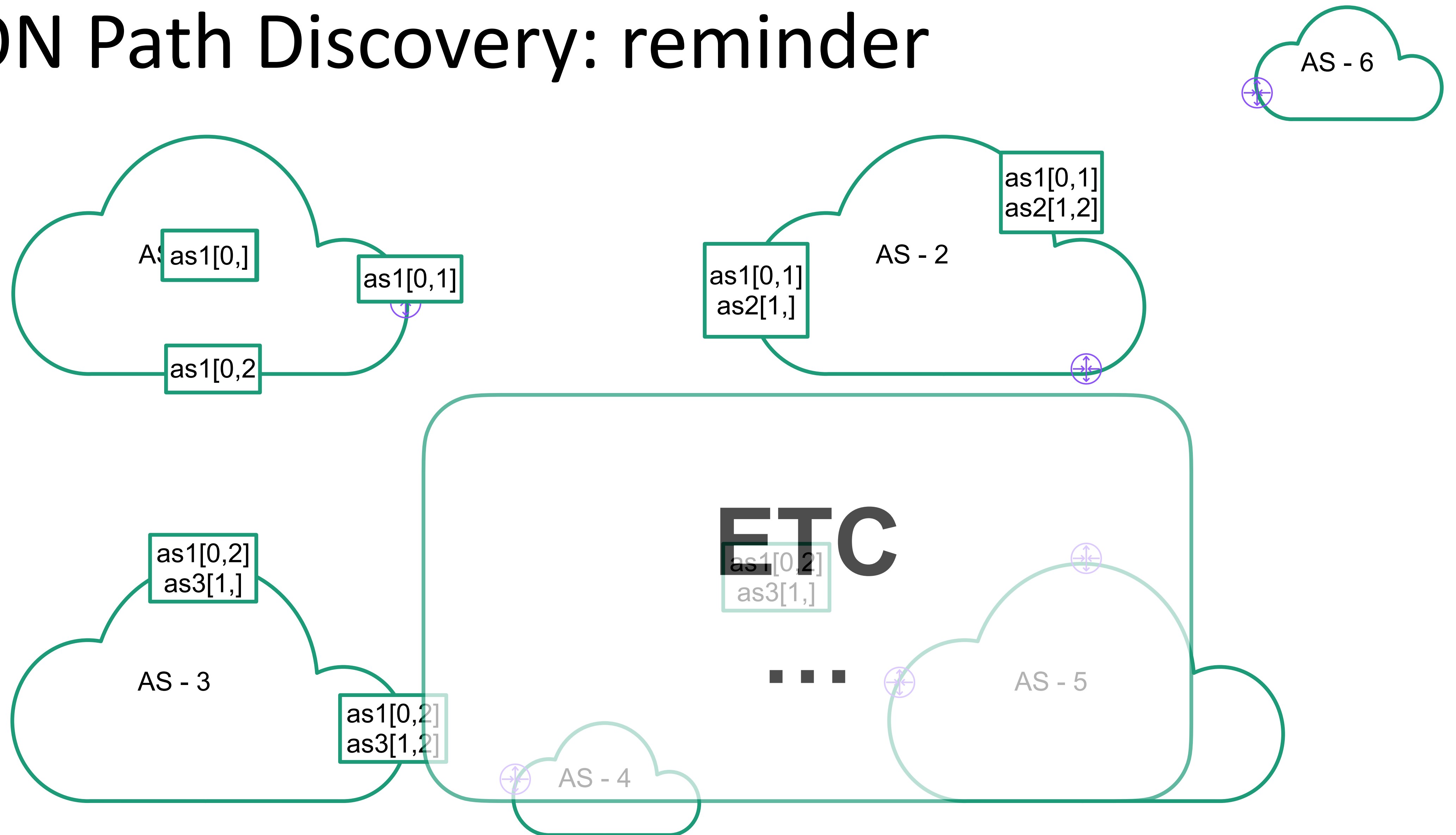
4. Data Plane Stability

- 4.1. Link Load Balancing
- 4.2. Reverse Path Refreshment
 - 4.2.1. Proposed Solutions (not comprehensive)

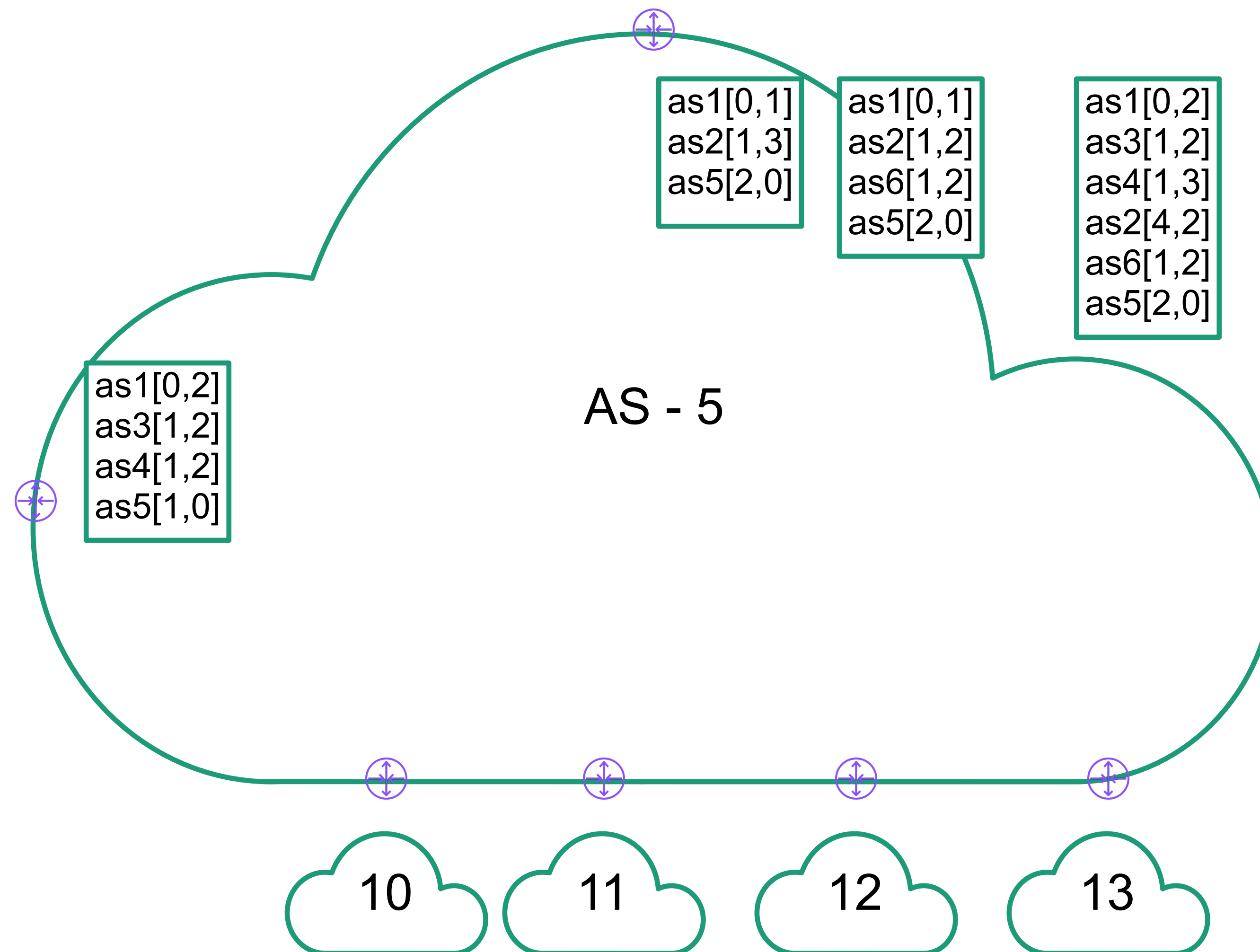
5. Interfaces for Path Awareness

6. Implications of Path Awareness for the Transport and Application Layers

SCION Path Discovery: reminder



SCION Path Discovery: reminder



SCION Path Discovery: reminder

- AS-5 now selects which PCBs to propagate onwards.
- Uses its own policy, criteria, etc. to select them.
- At each emission period, AS-5 may select different PCBs.
- Criteria such as:
 - Connectivity (new ASes) / Novelty (new interfaces).
 - Non-connectivity related such as Latency, Bandwidth, Geographic Position, MTU, Time to Live, etc.
- Some PCBs might never be propagated.
- This leads to an incomplete/suboptimal picture of the network for ASes 10-13.

Beacon Selection

- Current approach delegates the selection on each AS along the path; this prevents the receivers from receiving optimal paths according to their policies/preferences.
- How can we allow ASes to obtain paths ranked according to their “ranking function”?
 - At Internet scale. Low traffic
 - Preserving privacy of policies and “ranking functions”.
 - Ideally, anonymously.

Segment Dissemination

- Same principle as with Beacon Selection:
 - The receiver is the endpoint. The emitter is its local AS.
 - The endpoint's preferences are currently not communicated to the local AS
- The solution should:
 - Avoid segments that cannot “glue together”.
 - Preserve privacy of the endpoint's request.
 - Ideally, allow the endpoint to verify that there is no better alternative (proof of absence maybe?)

Reverse Path Refreshment

- In a client-server scenario, how can the server answer back to the client when the original path used by the client to the server is no longer valid?
- E.g. when the server's job is to answer, or keep answering, after a long time has elapsed since the client's initial request.
- Client responsibility to re-request the server?
- Standard way to inform (in the network layer) the server how to select the paths?

Thank You For Your Attention!

Questions & Remarks?

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