Index

- Motivation
- Overview of the Internet Draft
- Path Discovery
  - PCB Selection
  - Segment Dissemination
- Reverse Path Refreshment
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

- 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 obtains 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?

juan.garcia@inf.ethz.ch
tilmann.zaeschke@inf.ethz.ch