Internet Draft Updates

PANRG - IETF 121
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draft-dekater-scion-pki-07 & draft-dekater-scion-controlplane-06 & draft-dekater-scion-dataplane-03

Background: the SCION Internet Architecture

- Path-aware *inter-domain* Internet architecture, focusing on
  - Availability
  - Routing Security (path authorization & path security)

- In production use by multiple ISPs, serving the Swiss inter-banking network SSFN and a Research & Education network (later today), being rolled out for a healthcare network, a utility network.

- Core specification in 3 drafts, under ISE review. Goal:
  - Document protocol specification as deployed today
  - A potential starting point for future work

SCION Drafts Overview

Core SCION Specification

Read them together!

Open Questions

Research, lessons learned from deployment, long-term protocol evolution

Component	Document status	Internet Draft	Next Steps
PKI		draft-dekater-scion-pki-07	Awaiting further review feedback
Control Plane	Submitted to ISE	draft-dekater-scion-controlplane-06	Awaiting further review feedback
Data Plane		draft-dekater-scion-dataplane-03	Awaiting further review feedback
~~Overview~~	~~Incorporated into specifications I-Ds~~	~~draft-dekater-panrg-scion-overview-06~~	Deprecated Expires tomorrow
Component analysis	Expired	draft-rustignoli-panrg-scion-components-03	Not intended for publication
Deployment considerations	Table of Contents produced	draft-meynell-panrg-scion-deployment-00	Some contributions added Looking for inputs and contributors
Research questions	Table of Contents produced	draft-meynell-panrg-scion-research-questions-01	
DRKey	- Expired	draft-garciapardo-panrg-drkey	Submitted last update in 2022 by ETHZ. Can pick-up draft again if interest?

draft-dekater-scion-pki-07 & draft-dekater-scion-controlplane-06 & draft-dekater-scion-dataplane-03

ISE Drafts – Feedback Previously Addressed

in previous draft version – discussed at IETF 120

- Control & Data Plane
  - Introduced AES-CMAC as default MAC algorithm for interoperability
  - Configuration required to run an AS
  - Dependency on time synchronization
- Control plane:
  - gRPC API for control services
  - Service addresses – communication across control plane components
  - Scalability of beaconing
- More security considerations

For more details, see previous panrg presentation at IETF120.

ISE Drafts – Feedback Addressed

in the latest draft version

Drafts received significant feedback which we've attempted to address:

- Data Plane draft required most work
  - Handling link failures & SCMP specification
  - Clarifying router checks
  - MTU & fragmentation
  - Many language clarifications
- Control plane:
  - Completed Control Services gRPC API
  - Monitoring
- Introduction: clarify goal of the document and obsolete –overview draft
- References, editorial work, etc.
- Drafts now have a change log at the end – read them ☺

draft-dekater-scion-pki-07 & draft-dekater-scion-controlplane-06 & draft-dekater-scion-dataplane-03

Data Plane - SCMP

SCION Control Message Protocol (SCMP) – analogous to ICMP

- Required to be included in the spec to clarify handling of link failures (Internal Connectivity Down, External interface down)
- Also offers echo, traceroute (allows mapping segments to ISD-AS)

Type	Meaning
1	Reserved for future use
2	Packet Too Big (Section 6.5.1)
3	Reserved for future use
4	Reserved for future use
5	External Interface Down (Section 6.5.2)
6	Internal Connectivity Down (Section 6.5.3)
100	Private Experimentation
101	Private Experimentation
127	Reserved for expansion of SCMP error messages

Table 11: error messages types

Type	Meaning
128	Echo Request (Section 6.6.1)
129	Echo Reply (Section 6.6.2)
130	Traceroute Request (Section 6.6.3)
131	Traceroute Reply (Section 6.6.4)
200	Private Experimentation
201	Private Experimentation
255	Reserved for expansion of SCMP informational messages

Table 12: informational messages types

Data Plane - MTU

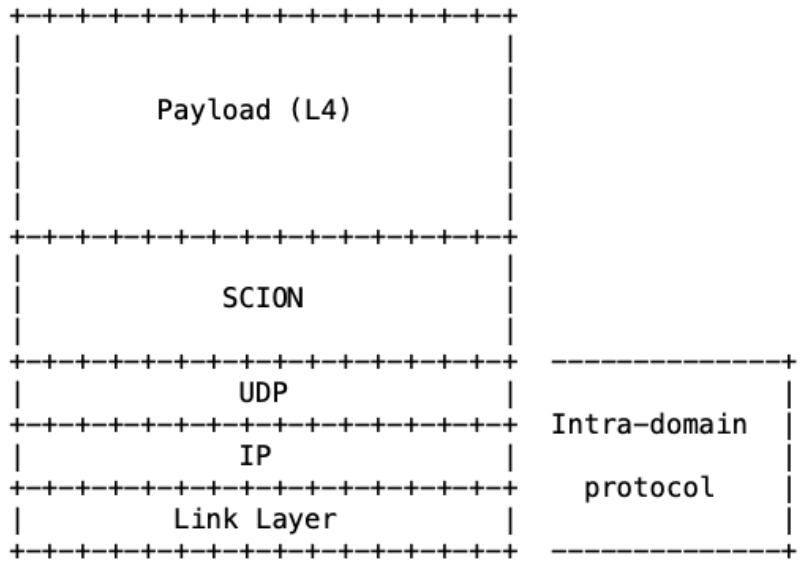
- Endpoints learn about path MTU during path lookup
  - Operators set MTU – this works today
  - If chosen path changes, MTU changes
  - No fragmentation in SCION → it must be handled by upper layer protocols

- MTU of 1232 is required from lower layer protocol
  - 1280, minimum IPv6 MTU as of RFC2460, minus 48 (assuming UDP/IPv6 as underlay).

Data Plane - Other Changes

- Where is SCION in the Stack?
- Does SCION do payload checksums?
  No
- How can I test SCION? → Reference to https://www.scionlab.org/
- What should I monitor in a SCION deployment?
  → 3. Deployment Considerations (new section in –controlplane)

→



-dataplane draft, Figure 1

Other Useful Feedback

Input for long-term protocol evolution

Architectural considerations, to be taken into account as an input for future protocol evolution

- Cross-layer checksums are a bad idea
- Interoperability/gateways
- Multi-ISD membership for ASes
- PCB selection policies

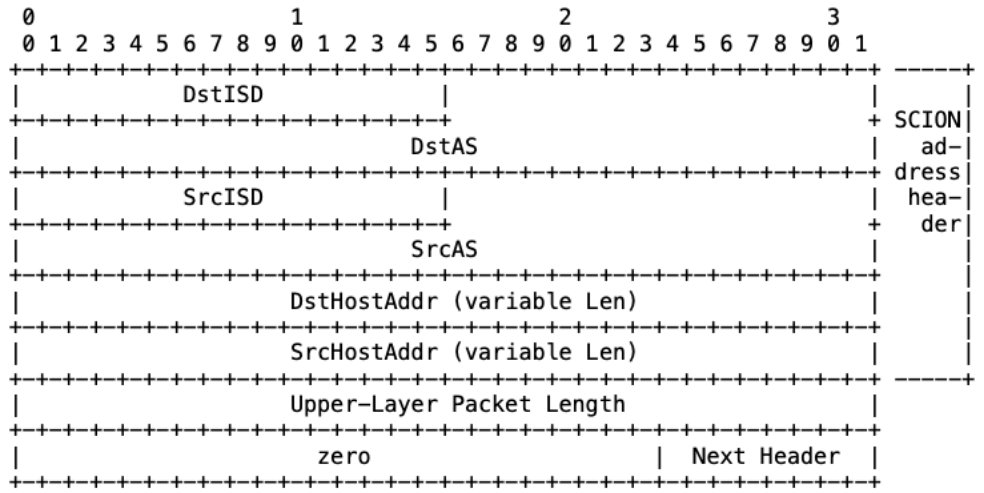


Figure 17: Layout of the pseudo header for the upper-layer checksum

Research Questions Draft

What are the questions, what documentation exists, what sections need to be written?

1. Discovery, Distribution and Trustworthiness of Path Properties
   - ISD and AS Scalability
   - DRKey
   - SCMP Authentication
   - Proof of transit (FABRID/EPIC)
2. Hummingbird (QoS)
3. Interfaces for Path Awareness (IPv6 Data Plane, SCION-IP Translation and tunneling)
4. Implications of Path Awareness for Transport and Application Layers (e.g. MP-QUIC)

draft-meynell-panrg-scion-research-questions-01

Deployment Issues Draft

What documentation exists, what sections need to be written?

1. Deployment Models: Network, Gateway, SCION-enabled Applications
2. Establishing and running an Isolation Domain
   - Governance & Coordination
   - ISD Policy Development & Maintenance
   - Assignment and registration of ISD numbers + SCION AS numbers
3. Establishing and running a SCION network
4. Adding and removing networks from an Isolation Domain
5. Connecting to other Isolation Domains
6. SCION-IP Gateway Deployment
7. PCB propagation policies
8. End Host Deployment

draft-meynell-panrg-scion-deployment

Thank You For Your Attention!

Questions & Remarks?

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