Hybrid Signature Spectrums

draft-ietf-pquip-hybrid-signature-spectrums

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PQUIP – IETF 120 – July 23, 2024

Adopted:

draft-ietf-pquip-hybrid-signature-spectrums

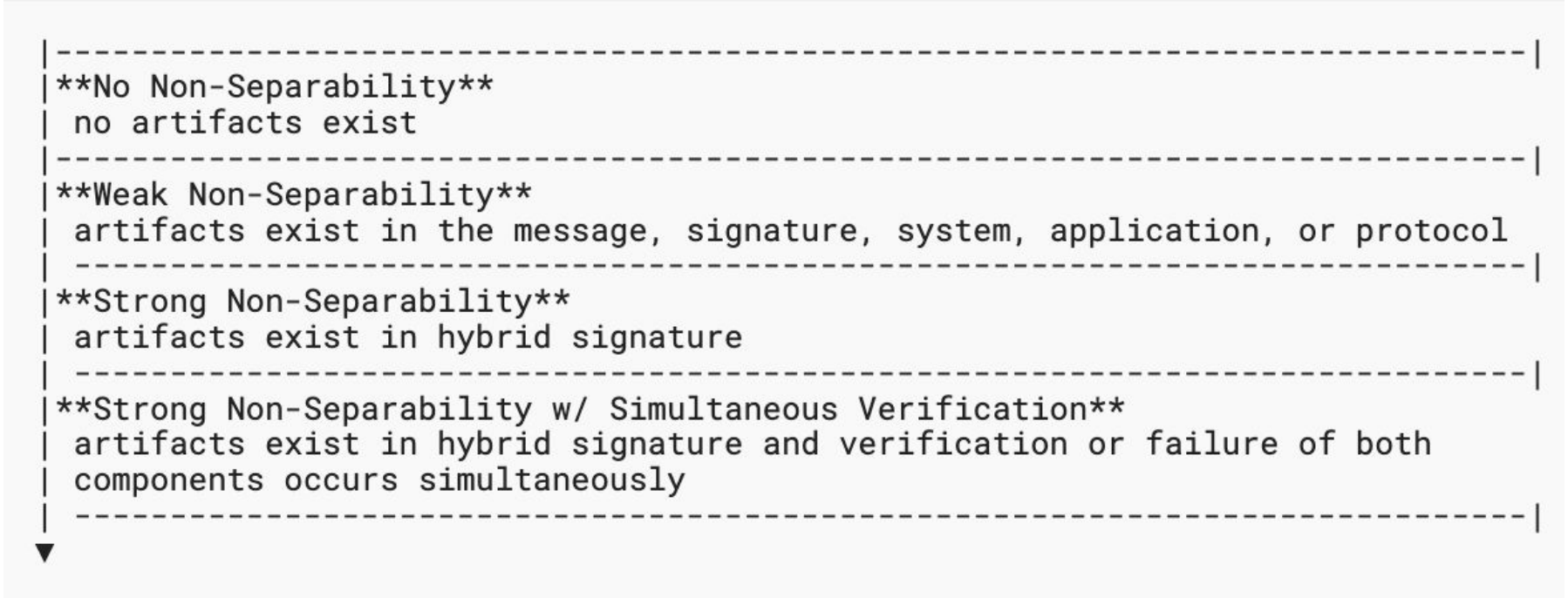
Sofía Celi <cherenkov@riseup.net> | Mon, 20 May 2024 14:36 UTC | Shov

Dear, list,

This email closes the call for adoption for
draft-hale-pquip-hybrid-signature-spectrums, which clearly passed and
addressed comments, and, hence, will be adopted.
Authors: please create draft-ietf-pquip-hybrid-signature-spectrums-00

Thank you,

Spectrum of Non-Separability



Generality / Need-for-approval spectrum

New Algorithm New signature scheme based on a selection of hardness assumptions Separate approval needed
No Approved Software Module Hybrid combiner supports security analysis that can be reduced to approved component algorithms, potentially changing the component implementations Uncertainty about whether separate approval is needed
1-out-of-n Approved Software Module Combiner supports one component algorithm and implementation in a black-box way but potentially changes the other component algorithm implementation(s) No new approval needed if the black-box component (implementation) is approved
All Approved Software Modules Hybrid combiner acts as a wrapper, fully independent of the component signature scheme implementations No new approval needed if at least one component implementation is approved

▼

Artifact Locations (ease-of-auditability)

Location of artifacts of hybrid intent	Level
Signature	Algorithm
Certificate	Protocol
Algorithm agreement / negotiation	Protocol
Message	Policy

Changes spurred by adoption call:

- More language on motivations for using hybrid solutions
- Language on whether or not hybrid signatures fit in one's threat model
  - without assuming that hybrid signatures are strictly necessary in general

We need your feedback

- Please read:

  https://datatracker.ietf.org/doc/draft-ietf-pquip-hybrid-signature-spectrums/

- If the WG likes the adopted text, want to try a last call?

Feedback welcome!

https://datatracker.ietf.org/doc/draft-ietf-pquip-hybrid-signature-spectrums/

GitHub: https://github.com/dconnolly/draft-ietf-pquip-hybrid-signature-spectrums

Hybrid Signatures Next Steps?

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Fused Hybrids

- Strong Non-Separability:
  - Artifacts in signatures
  - Verification failure in event of an attack (not just auditable later)
- Simplified forwards compatibility (fusion in signature, fewer changes to architecture)

Do we want this? Which algorithms (PQ/T) need to be blackbox implementations?

Which need to be blackbox algorithms (e.g., extra info in a hash)?

Proposed CFRG effort by Mike Ounsworth - looking for PQUIP system stakeholders

How to make concrete recommendations?

- Not in this document
- Maybe looks like the Hybrid KEMs workflow in CFRG:
  - CFRG puts together a Hybrid Signatures Design Team
  - Team comes up with narrow properties, patterns, and desired concrete schemes as design specifications
  - CFRG then takes that and writes the proper document, with several concrete constructions, and recommendations around their usage
- It may be early now, but a possible future pathway