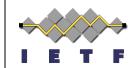
COSE and JOSE Registrations for Post Quantum Signatures

draft-prorock-cosepost-quantum-signatures



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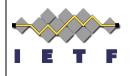
Mike Prorock IETF 114, Philadelphia July 2022

What's the deal with PQC?



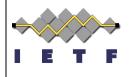
- Why introduce new forms of cryptography?
 - Shor's Algorithm
- Why support existing standards / formats?
 - Easier path to developer adoption
 - Creates an upgrade path for standards compliant software
- What Algorithms and Why?
 - Signature and Key Representations are the building blocks for secure identifiers and credentials.
 - Stronger agility from supporting multiple primitives
 - Lattice schemes have the best security/size tradeoff
 - Hash schemes have well established security properties
- NIST has announced candidates to be standardized

What are our goals?



- SPHINCS+, Falcon, Dilithium
- Intuitive upgrade path for post quantum
 - Enable leapfrogging from RSA to PQ
- Minimum cryptographic agility
 - Anticipate potential exploits in emerging tech
- Set a path for future PQ algorithms
- IANA Registrations
 - Mitigate ambiguity / parameterization related faults

What is new with PQC?



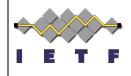
- Keys and signatures are larger
 - trade off between signing and verification times
- Larger number of parameters for some algorithms

 we need to keep optionality small based on expert feedback
- We need to be very clear about what parameters are in use with which signature schemes

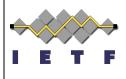
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Next Steps

- Details examples for Falcon and SPHINCS+
- Clarity on kty and alg in WG
- Test vectors, test vectors, test vectors
- Collaboration on OSS Implementations?
- Think about a separate spec for stateful schemes and/or key agreement?
 - XMSS / LMS
 - CRYSTALS-Kyber







Work Item Repository (Issues, PRs, Details): https://github.com/mesur-io/post-quantum-signatures

Datatracker:

https://datatracker.ietf.org/doc/draft-prorock-cose-post-quantum-signatures/

NIST PQC:

https://csrc.nist.gov/projects/post-quantum-cryptography/news https://csrc.nist.gov/projects/post-quantum-cryptography

Relevant Signature Schemes: https://pq-crystals.org/dilithium/ https://falcon-sign.info/ https://sphincs.org/