Standardization efforts for PQC in OpenPGP in the Project PQC@Thunderbird

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Background of PQC@Thunderbird

- BSI-project: contractors MTG with TU/e
- timeline: 12/2021 until 12/2024
- standardization of PQC in OpenPGP (NIST-PQC selection)
- implementation of proof-of-concept
  - multi-algorithm KEM and signature (lattice-based)
  - in Thunderbird (via RNP and Botan)
  - in GnuPG / Libgcrypt

Motivation

- Store now / decrypt later
- long-term security for signatures is required
- PQC is entering the standardization phase
- demand for PQC is observed in the field
- integration in existing protocols has started

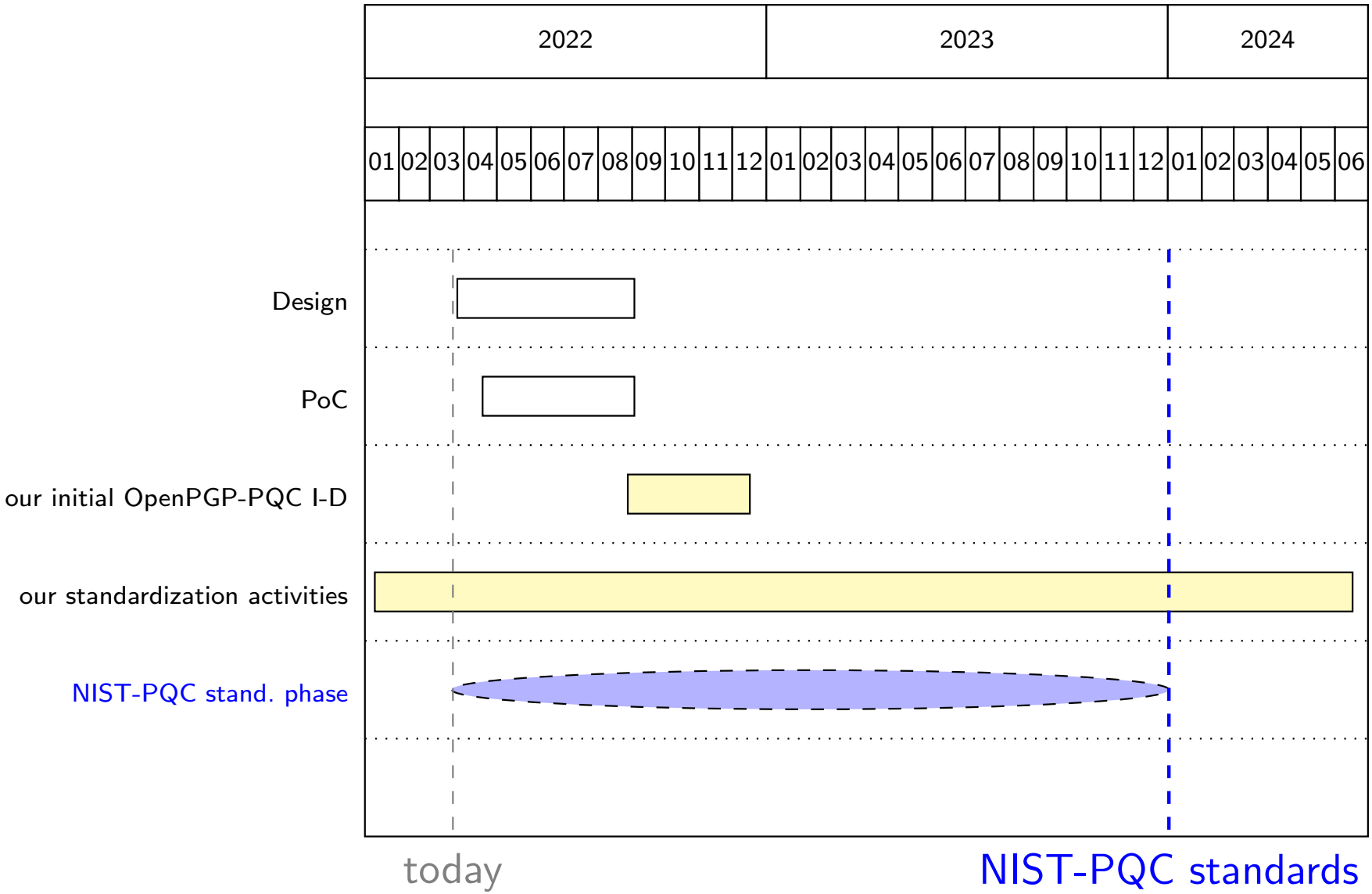
Completed and Ongoing PQC Standardization

Completed

- PQC scheme RFCs: XMSS (Informational), LMS (Informational), LMS in CMS and CBOR (both Proposed Standard)

Ongoing

- LAMPS IETF 113: numerous PQC-related drafts considered for adoption:
  - composite keys, encryption, signatures
  - binary data formats
- draft-vangeest-x509-hash-sigs: ASN.1 Encoding for hash-based schemes
- ETSI: TR on migration to PQC, etc.
- ISO: ongoing activities


2022
2023
2024
01 02 03 04 05 06 07 08 09 10 11 12 01 02 03 04 05 06 07 08 09 10 11 12 01 02 03 04 05 06
Design
PoC
our initial OpenPGP-PQC I-D
our standardization activities
NIST-PQC stand. phase
today
NIST-PQC standards

Design Criteria

- use multi-algorithm (classic + PQC, a.k.a. hybrid)
  - public keys
  - KEM construction (use established proposals)
  - signatures
- orientation to existing proposals / standards
- backwards compatibility:
  - for multi-algorithm public key formats
  - multi-algorithm signatures

Cooperation with the WG

- We are open for any kind of input or contribution
- We plan to work on a draft for later adoption by the WG