Updates on the NIST Threshold Call

(The 2nd Public Draft and the FHE Category)

HES8: 8th HomomorphicEncryption.org Standards Meeting

2025-Mar-23 @ Istambul, Turkey

Presented virtually from Maryland, USA, by Luís Brandão, NIST Foreign Associate (Guest Researcher, non-employee), Contractor from Strativia. Expressed opinions are from the speaker. The Threshold Call is joint work with René Peralta.

Preamble

1. **Thank you** for the invite
2. **Presentation goals:**
   - A preview of the Threshold Call 2nd public draft
   - Motivate engagement with the envisioned process
3. **Disclaimer:** Details may change until the final version is published

Outline

1. **The Threshold Call**

2. **Upcoming 2nd Public draft (2pd)**

3. **Notes on FHE**

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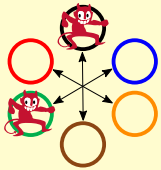
The NIST Call for *Multi-Party Threshold Schemes*

A public call for input, to form a body of reference material:



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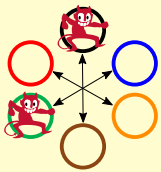

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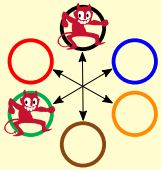

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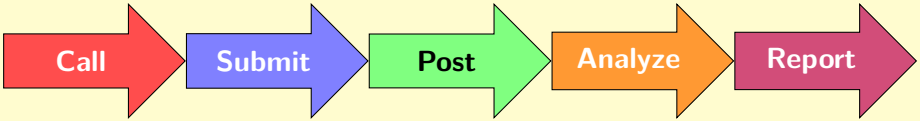
Establishes a process: (not a competition for selection of a standard)



A scope organized into two classes

- **Class N: NIST-standardized primitives** (Sign, PKE, Symm, KeyGen)

  KeyGen = Key Generation; PKE = Public-Key Encryption; Symm = Symmetric

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Each class is organized into various categories

	Sign	PKE	Symmetric	KeyGen	**FHE**	ZKPoK	Gadgets
NIST specified	N1	N2	N3	N4			
Special others	S1	S2	S3	S4	**S5**	S6	S7

Using notation of upcoming 2nd public draft (different from initial public draft)

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Phases and Deadlines

Phase	Subphase	Required?	Deadline
1. Previews	1.1: Preview 1	No	≈**X+2**
	1.2: Preview 2	No	≈**X+5**
2. Packages	2.1: Preliminary submission	No	≈**X+6**
	2.2: Regular submission	**Yes**	≈**X+8**
3. Analysis	3.1: Public presentations	**Yes**	(2026)
	3.2: Package updates	—	—
	3.3: NIST-MPTC report	**Yes**	(≈ 2027)

Tentative deadlines are relative (unit in months) to the publication date (X) of the final version of the Call.

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- **Preview:** abstract of a planned submission, followed by public presentation
- **Package:** specification, implementation, experimental evaluation
- **Analysis:** including seminar series

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- **Reference implementation:**
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Note: A submission can propose multiple crypto-systems. Each can be attributed to a distinct subteam.

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(Text/format under internal review)

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FHE in the Threshold Call

Category S5 (FHE), adapted from old "C2.6. Advanced"

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- **Threshold scheme:**
- **One instantiation:**
- **Performance evaluation:**

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- **Performance evaluation:** At least the threshold scheme. **Also encouraged:** conventional (non-threshold) FHE scheme, with actual homomorphic evaluation.

  Note: use cases are not prescribed; suggestions from HES will be useful for future comparisons.

Concluding remarks

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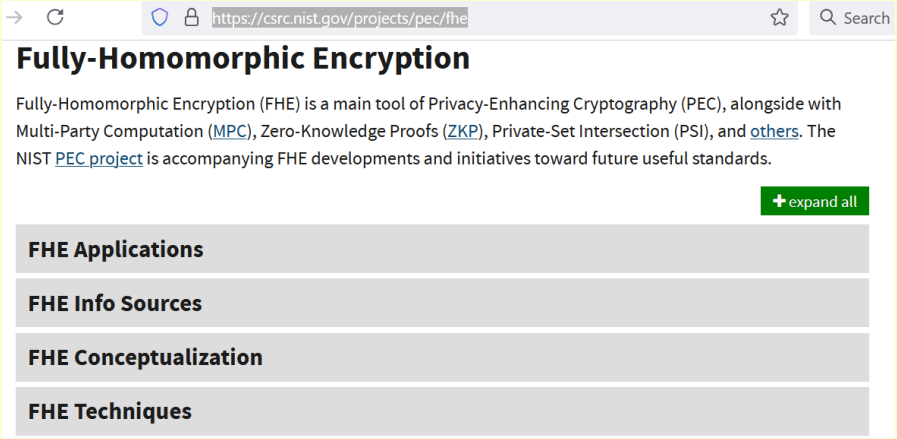
  - The analysis will also rely on community contributions.
- **The process is tapping into advanced cryptography**
  - Including FHE in the Threshold Call allows a robust exploratory process.
  - The results will support a future report (recommendations, ...).

A PEC/FHE webpage

The PEC project website includes an FHE page (feedback welcome)



Thank you for your attention!

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Useful links:

- **MPTC Website:** https://csrc.nist.gov/projects/threshold-cryptography
- **Subscribe to the MPTC-Forum:** https://csrc.nist.gov/projects/mptc/email-list
- **Upcoming second public draft:** https://csrc.nist.gov/pubs/ir/8214/c/2pd