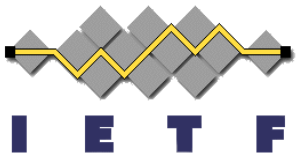
The Need:
Standards for Selective Disclosure and Zero-Knowledge Proofs



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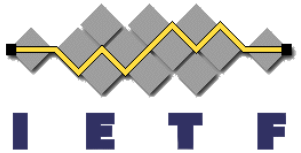
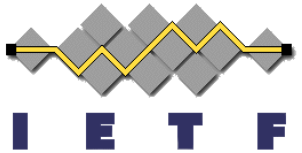
JSON Web Proofs BoF
IETF 114, Philadelphia
July 25, 2022

The Success of JOSE and its Roles



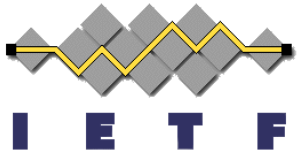
- JOSE and JWT have been widely adopted for identity use cases
  - Including for OpenID Connect and STIR
- Its model has two roles:
  - Issuer and Recipient
  - Issuer typically knows who the intended Recipient (the audience) is
  - All claims are disclosed to the Recipient

New Developments and New Roles



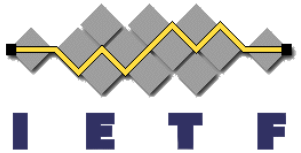
- Newer solutions such as Verifiable Credentials have three roles
  - Issuer, Holder, and Verifier
  - Designed to enhance privacy
- These separate credential issuance from credential presentation
  - Issuer typically does not know who the verifier is or what subset of issued claims will be disclosed to it
- JOSE/JWT is an adopted representation for VCs
  - However, JWS and JWT have limitations that make privacy protection challenging

JOSE/JWT Limitation: Selective Disclosure



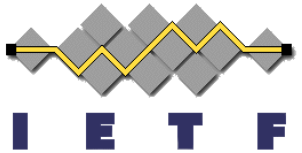
- Clunky to use JOSE/JWTs for Selective Disclosure
- Requires issuing custom JWTs containing only the disclosed claims in real time
- Requires Issuer to be online
- Lets Issuer know who the Holder is and what claims it wants
- “Call-home” to issuer on every use not privacy preserving

JOSE/JWT Limitation: Unlinkability



- Desirable to perform identity-related interactions without identifying the participants and enabling correlation
- Again, clunky to do with JOSE/JWTs
- Workaround is to request a new token per Verifier from the Issuer each time
- Or pre-issuing batches of tokens to use a different one per Verifier
  - Such that they are single-use tokens

New Cryptography – New Formats



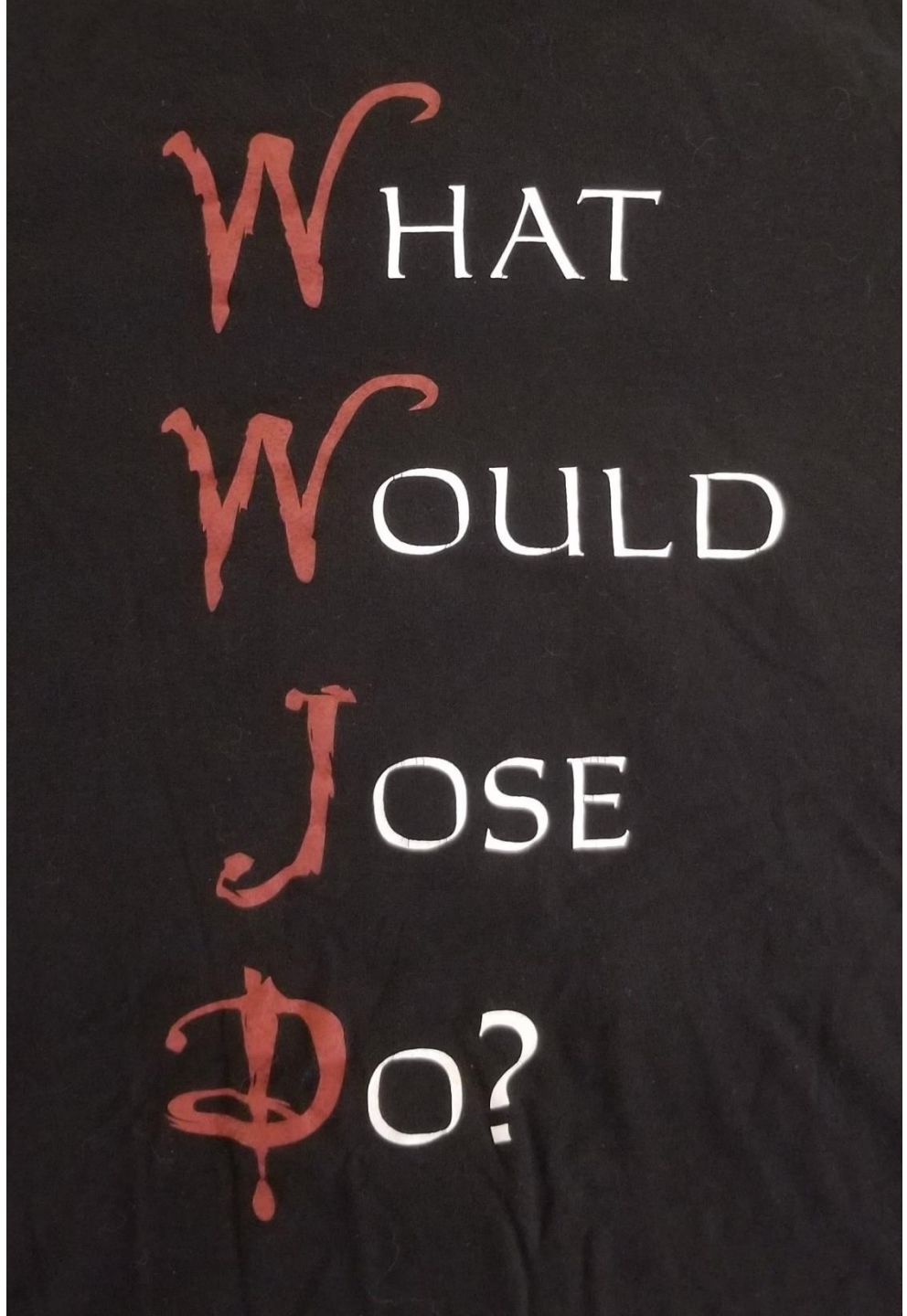
- Overcoming these limitations efficiently and securely a subject of much academic and applied-cryptography research
  - Often referred to as “Anonymous Credentials”
- Cryptographic techniques developed include pairing-friendly curves and zero-knowledge proofs

- ***Existing JOSE and JWT specs not capable of utilizing these new cryptographic techniques***

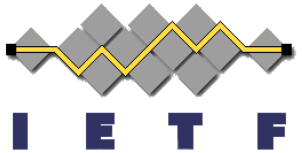
The Need

- JSON representations for the new cryptographic techniques
- A working group to standardize these representations in

- *More will be said about applications and use cases shortly…*

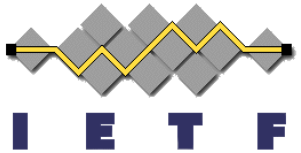

WHAT
WOULD
JOSE
DO?

Why re-form the JOSE WG?



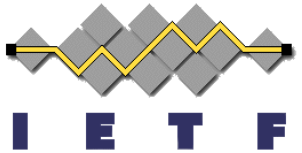
- We’re defining a new JSON-based cryptographic format
  - JOSE defined the JWS and JWE (and JWK) formats
  - The JSON Web Proof (JWP) format parallels them, but for new cryptographic techniques, effectively expanding the JOSE family
- The JOSE working group participants are the right people
  - Existing expertise defining practical JSON-based cryptographic representations
- Why not the COSE working group?
  - COSE members specialize in compact binary representations
  - JSON has more limitations than CBOR, making JOSE a better fit

Proposed New Charter for JOSE



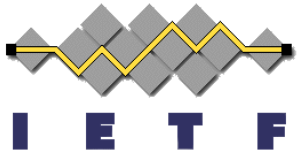
- Proposed charter text included in BoF proposal
  - https://github.com/json-web-proofs/json-web-proofs/blob/main/charter-ietf-jose-03.md
- Structure of the charter text is:
  - Review of JOSE's past deliverables
  - Motivation for new work
    - (Previous section of this presentation covers the same content)
  - Chartered Deliverables

Chartered Deliverables (1 of 2)



- An Informational document detailing **Use Cases and Requirements** for the new JSON Object Signing and Encryption (JOSE) specifications enabling selective disclosure and zero-knowledge proofs.
- Standards Track document(s) specifying **representation(s) of independently-disclosable integrity-protected sets of data and/or proofs** using JSON-based data structures, which also aims to prevent the ability to correlate by different verifiers.
- Standards Track document(s) specifying **representation(s) of JSON-based claims and/or proofs** enabling selective disclosure of these claims and/or proofs, and that also aims to prevent the ability to correlate by different verifiers.

Chartered Deliverables (2 of 2)



- Standards Track document(s) specifying **new algorithms and algorithm identifiers**.
- Standards Track document(s) specifying **how to represent keys** for these new algorithms as JSON Web Keys (JWKs).
- An Informational document defining **test vectors** for these new JOSE specifications.
- Standards Track document(s) defining **CBOR-based representations** corresponding to all the above, building upon the COSE and CWT specifications in the same way that the above build on JOSE and JWT.