http://mathmesh.com/

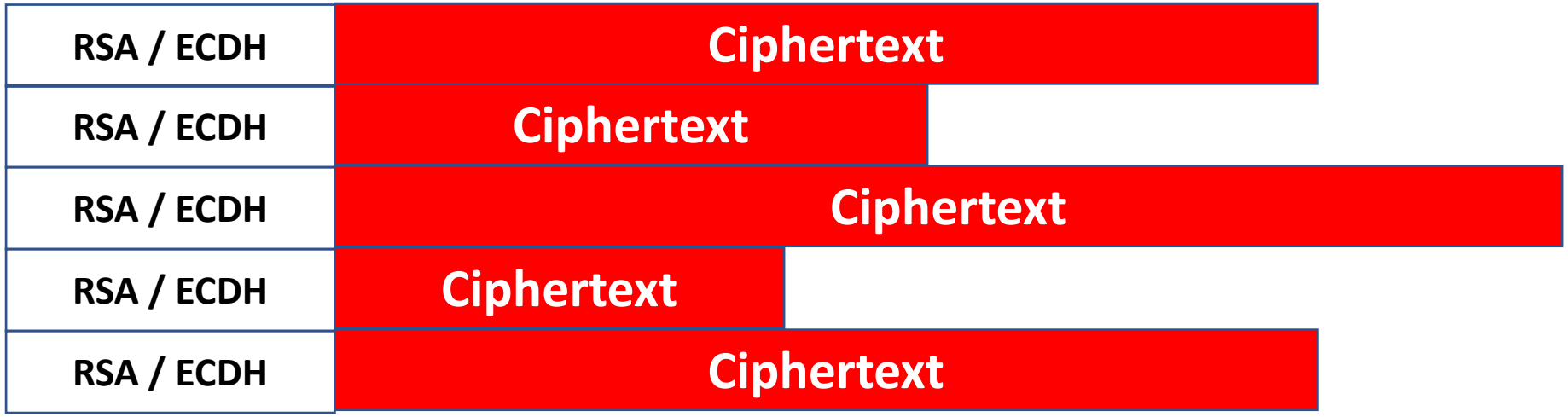
Data At Rest Encryption

DARE Container / DARE Message

Phillip Hallam-Baker

Comodo Security Solutions

Encrypting log files with OpenPGP*



- Each entry is a separate message
- Big overhead, no return

* S/MIME = OpenPGP + ASN.1

DARE Container

- Designed to support ***incremental encryption*** & authentication
  - Append only log
- Authentication
  - Digest Chain* or Merkle Tree.
  - Signature on individual records, chain or tree
- Encryption
  - Key exchange can be used for one record or multiple records.
  - Supports encrypted payloads and attributes.

* For my ICO see www.dunningkrugerrand.com

Efficiency

- All write operations are log(n) or better
  - Open container
  - Append record

- Read efficiency depends on container type*
  - First, Last, Previous, Next are O(1).
  - Seek is O(n) for simple container Log(n) for Tree

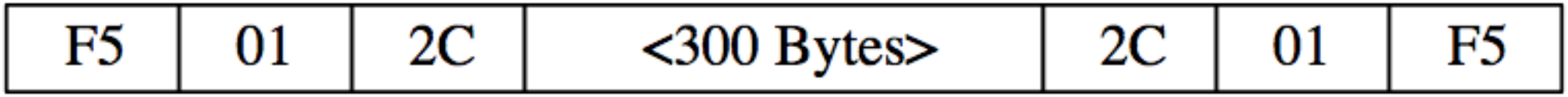
- Choose JSON or JSON-B (Binary) encoding.
  - Can keep log entry size within O/S atomic write limit.

* If you encrypt a container and lose the key, performance will suffer

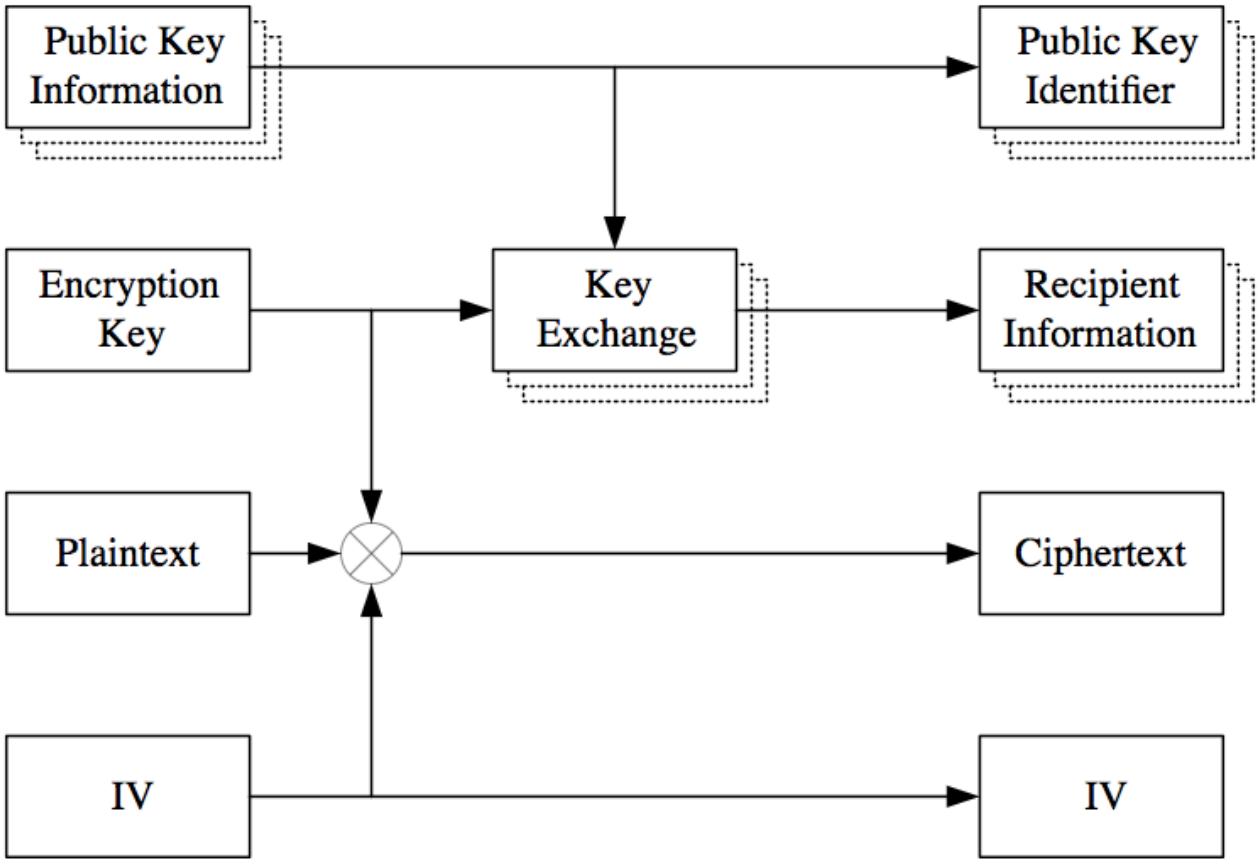
Technology

- Based on JSON Web Encryption and JSON Web Signature
  - Some reorganization of tags
  - Same semantics

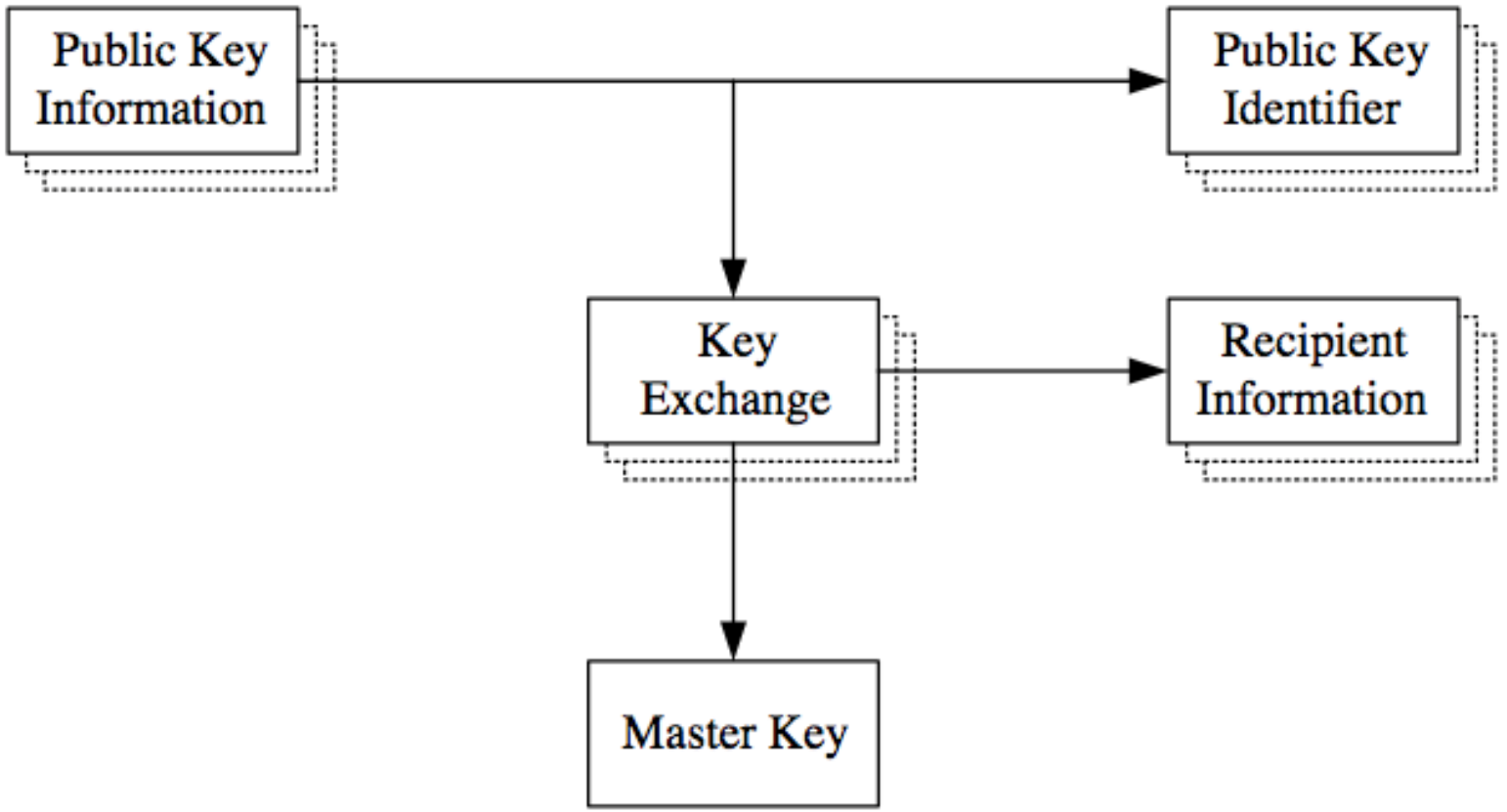
- Uses binary encoding for frame headers
  - Frames are bidirectional



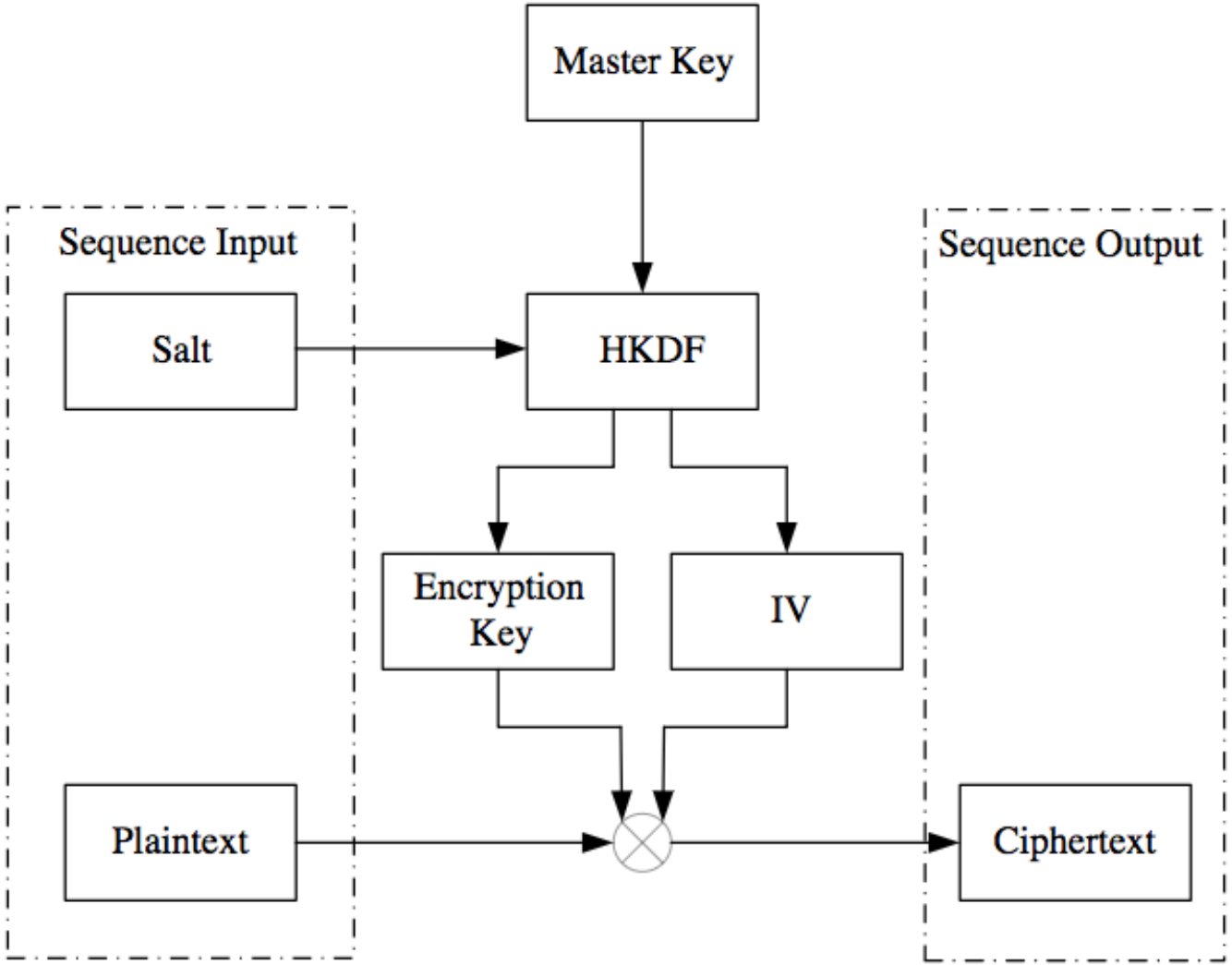
Standard Key Exchange



DARE Key Exchange #1



DARE Key Derrivation



Applications

- Format for
  - Archiving Web Sites offline
  - Lightweight persistence store
    - Messages / Bookmarks / Credentials / Calendar
  - Encrypting server logs
  - If you are told to ‘do it in blockchain’

- Applied to
  - Protecting PII in server logs to meet GDPR requirements*

* The ‘put a bird on it’ school of GDPR compliance

Next Steps…

- AD Sponsored
  - It is basically a content format
- Form Working Group
  - It has security concerns
- Wait and do with key management
  - But it is logically separate