JavaScript Message Syntax (JSMS)

`draft-rescorla-jsms-00`
IETF 80

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* Presenting

Overview

- Lots of need for cryptographically protected (signed/encrypted) messages
  - XMPP, OAuth, RELOAD, ...
- Empirically implementors (and designers) don't want to use CMS
  - Fear of protocol complexity
  - ASN.1 allergy
  - Especially bad fit for JavaScript, which does badly with binary encodings
- Result is people avoid secure messaging entirely (XMPP, OAuth) or invent their own formats (RELOAD)

- We need a format people are actually willing to implement

Current Efforts

- WebToken (`draft-jones-json-webtoken-03`, `draft-jones-json-web-signature-01`)
- JSMS (`draft-rescorla-jsms-00`, this talk)
- Web Object Encryption and Signing (WOES) bar BOF (tonight at 2000 in Karlin I)

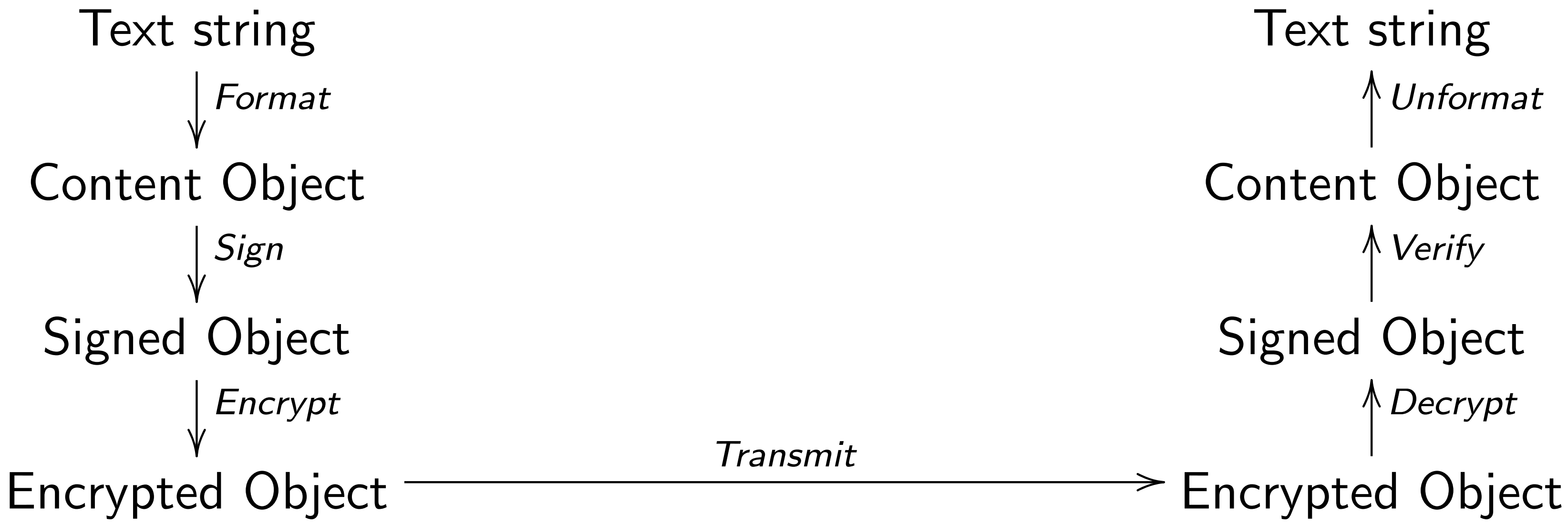
JSMS: The Basic Idea

- Use JSON encoding
  - Very convenient for working in JavaScript
  - JSON libraries are readily available for other languages
- Pick the simplest and most common use cases
  - Digital signature
  - Encryption under recipient's public key (+ MAC for integrity)
  - Encryption with a shared symmetric key (+ MAC for integrity)
- Design for maximum implementation simplicity
  - No canonicalization
  - Base-64 anything difficult to represent as a string
  - In-memory processing (no streaming operation)

* WARNING: Hard hat area

Sample Workflow

Sender **Receiver**



Text string

Format

Content Object

Sign

Signed Object

Encrypt

Encrypted Object

Transmit

Encrypted Object

Decrypt

Signed Object

Verify

Content Object

Unformat

Text string

Content Objects

```
{
    "ContentType":"text/plain; charset=UTF-8",
    "Type":"content",
    "Data":"SGVsbG8sIFdvcmxkCg==",
    "ID":"746a4c9f-8e84-4313-b669-81590ee2949e",
    "Created":"2011-03-07T16:17Z"
}
```

- Wrapper around whatever the original content was
- Content-type to identify the format
- Base64 to protect potentially dangerous characters
- Datestamp and ID for anti-replay

Signed Objects

```
{
    "SignedData":"ewogICAgIkNvbnRlbnRUeXBlIjoidGV4dC9wbGFpbjsgY2hhcn
                  ...  IKfQ==",
    "DigestAlgorithm":"SHA-256",
    "SignatureAlgorithm":"RSA-PKCS1-1.5",
    "Signer":"xmpp:romeo@example.net",
    "Signature":"sNsxJltUaz4pSzAtJiPZagUMV4SwWugWexGbffK/WJRDi2uq7TxN
                 ... SJfIdiAJNA+nEnk="
    "CertChain:{
       "Type":"PKIX",
       "Chain":[ ... ]
    }
}
```

- Signature computed over binary representation of Contents
  - Base64-encoded to prevent damage in transit
- Support for PKIX certificates*

*But wait, aren't certificates in ASN.1? More on this shortly

Wait, aren't PKIX certs in ASN.1/DER?

- Answer 1: Do without
  - Can potentially use raw public keys (not supported yet)
- Answer 2: Certificates are easier to isolate
  - Stand up a Web service to verify/decode (natural in a Web 2.0 app)
  - ... remember that the JS probably came from the server anyway
- Answer 3: Replace
  - Natural to have the contents of a Signed object be a key/identity binding
  - Eventually expect to have a simple JSMS-based certificate format

What's next?

Come to the WOES bar bof: Tonight at 2000 in Karlin I