

COALA IP Protocol

Goals

A licensing framework for digital assets that:

- Is easily approachable by all participants (*devs, rights holders, copyright societies, ...*)
- Is easily extensible and future-proof
- Guarantees immutability and tamper-resistance
- Is blockchain-agnostic
- Is free (free as in FOSS) for everyone to participate and use

History

- COALA - organize blockchain workshops & working groups. Meet 3-4 times per year.
- COALA IP working group started in fall 2015
- Contributors from COALA, IPFS, Ujo / Consensys, Mycelia, ascribe / BigchainDB, Synereo, mediachain, more.
 - Relations with Copyright Hub, Open Music Initiative, many blockchain IP startups
 - Bolt into Ethereum, IPFS, IPDB (public BigchainDB)
- Mantra: invent as little as possible, reuse well-considered building blocks

Building blocks

LCC framework, it's concise and applicable

Generalizes DDEX (music), PLUS (photos), more
By Copyright Hub with 90 partner orgs

Linked Data, it's easily extensible

JSON-LD: URI-linking of JSON objects

IPLD, for cryptographically verifiable integrity

Via Merkle-linking of JSON objects

Interledger Protocol, allows IP to live on many ledgers

Linking of ordered transactions on blockchains

The LCC Framework

A standard that generalizes existing, widely used IP standards, including DDEX (music), PLUS (photos)

Documentation:

- LCC Ten Targets for a Rights Network
- LCC Principles of Identification
- LCC Entity Model (short: LCC EM)
- LCC Rights Reference Model (short: LCC RRM)

⇒ 7 (main) entities

Note: Some element names are abbreviated because of space

IPLD

Merkle-linking JSON objects

- Cryptographic integrity-checking of data

Merkle-paths JSON objects

- Content-addressable data/storage

IPLD: Merkle-Linking example

```
import ipld
```

```
In [2]: person = {
```

```
...:     "givenName": "Andy",
```

```
...:     "familyName": "Warhol",
```

```
...:     "birthDate": "1928-08-06"
```

```
...: }
```

```
In [3]: serialized_person = ipld.marshal(person) # serialize using CBOR
```

```
Out[3]: b'\xa3ibirthDatej1928-08-06jfamilyNamefWarholigivenNamedAndy'
```

```
In [4]: ipld.multihash(serialized_person) # hash CBOR value and get a hash digest
```

```
Out[4]: 'QmRinxtytQFizqBbcRfJ3i1ts617W8AA8xt53DsPGTfisC'
```


Linked Data: Resource Description Framework (short: RDF)

A way to express assertions in a schematic way



```
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:xhtml="http://www.w3.org/1999/xhtml/vocab#">

  <rdf:Description rdf:about="http://lessig.org/blog">
    <xhtml:license resource="http://creativecommons.org/licenses/by/3.0/" />
  </rdf:Description>

</rdf:RDF>
```

Linked Data: JSON-LD

A data structure to serialize RDF in JSON

```
{  
  "@type": "http://schema.org/Person",  
  "@id": "http://example.com/data/AndyWarhol",  
  "givenName": "Andy",  
  "familyName": "Warhol",  
}
```

`http://example.com/data/AndyWarhol`

`http://www.w3.org/1999/02/22-rdf-syntax-ns#type`

`http://schema.org/Person .`

Useful RDF schemata

LCC RRM Party:

schema.org/Person

schema.org/Organization

LCC RRM Creation:

schema.org/CreativeWork

And its subtypes: Book, Movie,
MusicComposition

LCC RRM Place:

schema.org/Place

LCC RRM Assertion:

schema.org/AssessAction

Additionally: Web of Trust Ontology

Interledger Protocol (ILP)

A standard in progress as a W3C Community Group

To connect many blockchains / ledgers for transfer of value

Crypto-conditions: building blocks of crypto primitives

Includes multisig, escrow but not loops, recursion



Bringing it together: COALA IP Protocol

A community-driven *minimum-viable set of data* for IP licensing
(RDF schema definitions, JSON-LD)

A free and open *messaging* protocol for license-transactions
(LCC, Interledger, IPLD)

COALA IP: Place

```
{  
  
  "@type": { "/": "<hash pointing to RDF-Schema of Place>" },  
  
  "geo": {  
  
    "@type": { "/": "<hash pointing to RDF-Schema of GeoCoordinates>" },  
  
    "latitude": "40.75",  
  
    "longitude": "73.98"  
  
  },  
  
  "name": "Empire State Building"  
  
}
```

COALA IP: Party (only Individual)

```
{  
  
  "@type": { "/": "<hash pointing to RDF-Schema of Individual>" },  
  
  "givenName": "Andy",  
  
  "familyName": "Warhol",  
  
  "birthDate": "1928-08-06",  
  
  "deathDate": "1987-02-22"  
  
  // and any other arbitrary meta data  
  
  // TDB: Let's use an established identity protocol here  
  
}
```

COALA IP: Creation

```
{  
  
  "@type": { "/" : "<hash pointing to RDF-Schema of Creation>" },  
  
  "name": "Lord of the Rings",  
  
  "author": { "/" : "<hash pointing to the Author>" }  
  
}
```


COALA IP: Creation (a *digital* Manifestation)

```
{  "@type": { "/": "<hash pointing to RDF-Schema of Manifestation>" },

  "name": "The Fellowship of the Ring",

  "creation": { "/": "<hash pointing to the Creation>" },

  "digital_work": { "/": "<hash pointing to a file on e.g. IPFS>" },

  "fingerprints": [

    "Qmbs2DxMBraF3U8F7vLAarGmZaSFry3vVY5zytuN3BxwaY",

    "<multihash/multifingerprint value>"

  ],

  "locationCreated": "<URI pointing to a Place object>"

}
```

COALA IP: Creation (a *physical* Manifestation)

```
{  "@type": { "/": "<hash pointing to RDF-Schema of Manifestation>" },

  "name": "The Fellowship of the Ring",

  "creation": { "/": "<hash pointing to the Creation>" },

  "datePublished": "29-07-1954",

  "locationCreated": "<URI pointing to a Place object>"

}
```

COALA IP: Right

```
{  "@type": { "/": "<hash pointing to RDF-Schema of Right>" },

  "usages": "all|copy|play|stream|...",

  "territory": { "/": "<hash pointing to a Place>" },

  "context": "inflight|inpublic|commercialuse...",

  "exclusive": true|false,

  ...

  "manifestation": { "/": "<hash pointing to the Manifestation>" },

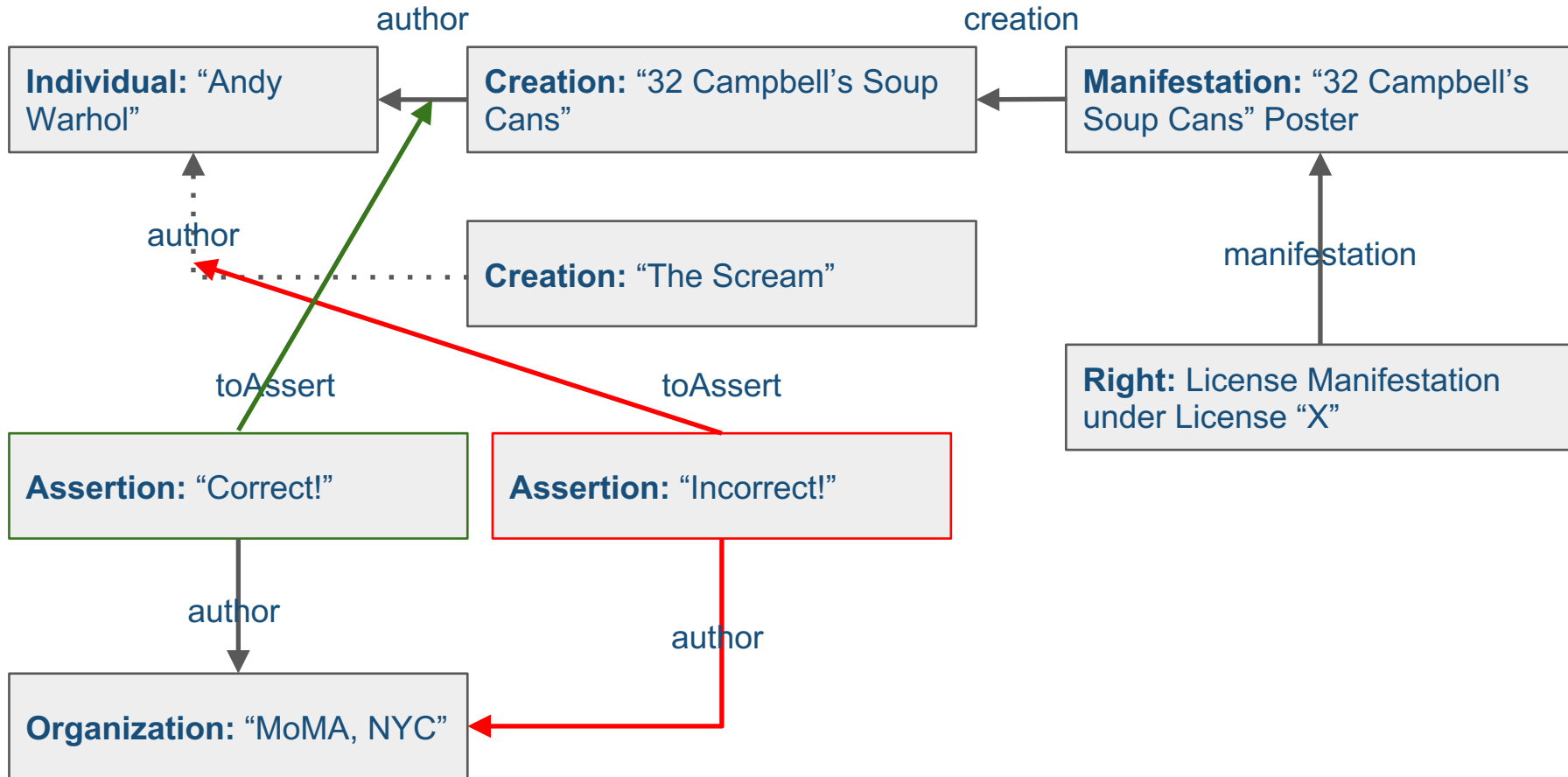
  "license": { "/": "<hash pointing to the License>" }

}
```

COALA IP: RightsAssignment

- A special case: RightsAssignments must be stored in an *ordered fashion*
- Store on an **Interledger Protocol compliant ledger**
 - Provenance of assets (chain of events)
 - *True* ownership of assets (priv and pub key)
 - Enhanced transfers (escrowed, multi-sig)

COALA IP: Assertion



Summary

Goal is licensing framework for digital assets

- Using previous building blocks as much as possible

COALA IP Protocol is

- A minimum-viable set of data for IP licensing (RDF schema definitions, JSON-LD)
- A free and open messaging protocol for license-transactions (Interledger, IPLD, LCC)

A community is defining, refining and deploying it

- Into Ethereum, IPFS, IPDB (public BigchainDB) networks