

# EFWG 2022-10-13 Meeting - Trinsic

## Meeting Schedule

- Bi-Weekly at 8:00-9:00 am PST / 11:00-12:00 am EDT / 15:00 – 16:00 UTC / 17:00 - 18:00 CET
- <https://zoom.us/j/95389236256?pwd=RFErMm9SS0tBenA1Q0dSYlpXK3Bqdz09>

## Attendees

- [Steve Magennis](#)
- [Eric Drury](#)
- [Carly Huitema](#)
- [P A Subrahmanyam](#)
- Fireflies.ai Noetaker Mark
- Richard Zbinden (new)
- Vlad Zubenko
- Anita Rao
- Callum Haslam
- Charles Macpherson (new)
- Jason (new)
- Chi Hwa Tang
- dhoffman
- Gary de Beer
- Jacques Bikoundou
- Jorge Flores
- Ken Garner
- Neil Thomson
- Phil Wolff
- Richard Zbinden
- Savita
- Scott Perry
- [Sumabala Nair](#)
- Thomas
- Tomislav Markovski
- Trinh

## Presentation Files

- [Presentation slides](#)
- [Example VCs showcased during the Demo](#)
- [Trinsic's open source implementation of Trust Registry with eSSIF Lab](#)

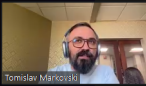
## Recording

- [Meeting Recording](#)

## Notes

## Agenda Items & Meeting Notes

- Welcome & Introductions
  - EFWG Community Topics & Announcements
  - Presentation from Trinsic: "Solving Governance in SSI Ecosystems with Trust Registries"
  - Q&A / Discussion
- 
- Ecosystem white paper passed by all members present with no dissent
- 
- Tomislav Markovski presenting Ecosystem Governance and SSI - Trust Registries



# Ecosystem Governance & SSI

Trust Registries

Tomislav Markovski  
Trinsic



## Importance of Governance in Identity

*To provide a layer of trust in an open ecosystem*



- Importance of Governance in Identity - to provide a layer of trust in an open ecosystem
  - need to protect authentic data

## Examples of Technical Approach to Governance

- Single authority
- Multiple authorities (enterprise network, consortium, etc)
- Authority Delegation
- Reputation based
- Voting based



Multiple approaches to Governance - who provides the root of trust

- First three - are fairly decentralized methods
- last two more decentralized model

## Trust Registry

Governance problem to solve:

- Can Acme act as an issuer of Driver's License under the authorized license issuers act?
- Is this verifier authorized to verify this credential type under the given ecosystem governance framework?



## Trust Registry

Practical problems to solve

- It is infeasible for all verifiers to maintain lists of all authorized members in a given ecosystem governance framework
- Cross ecosystem trust establishment



- Trust Registry
  - answers if an ecosystem participant has authority to act according to governance framework
  - practical problem - how for all verifiers maintain lists of all authorized members in a given ecosystem
  - cross ecosystem trust establishment - different ecosystems can identify other ecosystem's trust registries that they also trust
- Participants don't have to trust ecosystem itself, but that data providence is trusted

## Types of Trust Registries

- Collection based
  - Databases
  - ACL (access control lists)
- Privacy-preserving
  - Cryptographic Accumulators
  - Merkle Trees



### Types of trust registries

- Thinking about them in term of technical solutions
- Not just a list of members, can be other types as well

- Trinsic has done work with centralized trust registries

## ToIP Trust Registry Protocol Specification

- Governing Authority
- Ecosystem Governance Framework
- Authoritative Member
- Authorized Action (Issue, verify)
  - Authorized Data Type (Credential, Presentation, Schema)
- Trust Registry



### ToIP trust registry protocol specification

## Related Efforts

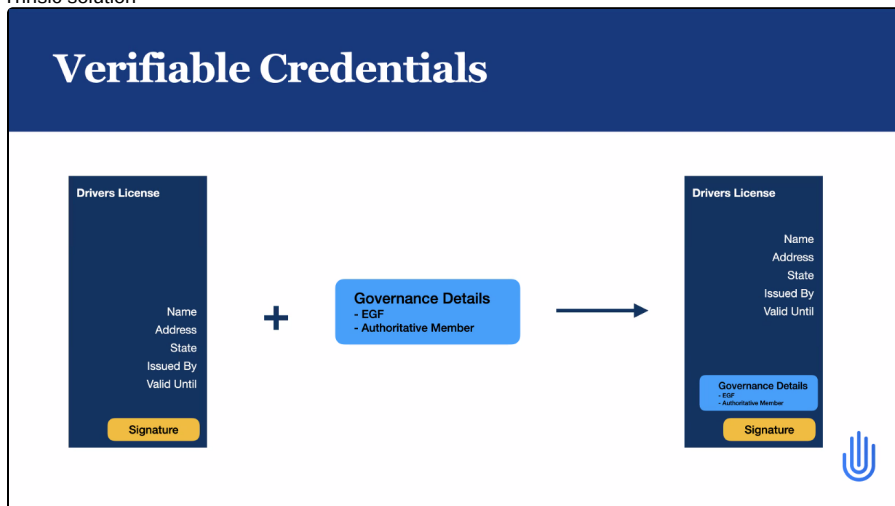
- Trust Establishment (status: Strawman) - incubated at DIF  
<https://identity.foundation/trust-establishment/>
- TRAIN project (TRust mAnagement INfrastructure) -  
incubated at eSSIF Lab  
<https://essif-lab.eu/essif-train-by-fraunhofer-gesellschaft/>



### Related efforts

- Trust Establishment currently under early development <https://identity.foundation/trust-establishment/>
- TRAIN- registering definitions of credential schemas <https://essif-lab.eu/essif-train-by-fraunhofer-gesellschaft/>

- Trinsic solution



- the ToIP trust registry specification merged with verifiable credentials
- No information coded in credential how valid is the credential
  - in an open ecosystem can have anyone issuing credentials
  - add the governance information to the credential for referencing.
  - Can validate the issuer ID but also the governance associated with it.
- Demo - no yet in production, CLI demo,

## Demo

### Trust Registries with Verifiable Credentials in the Trinsic Ecosystems platform



```

credential-1.json > {} credentialStatus
1 {
2   "context": [
3     "https://www.w3.org/2018/credentials/v1",
4     "https://w3id.org/bbs/v1",
5     "https://schema.trinsic.cloud/tm/iso18013-drivers-license/context"
6   ],
7   "credentialSchema": [
8     {
9       "id": "https://schema.trinsic.cloud/tm/iso18013-drivers-license",
10      "type": "JsonSchemaValidator2018"
11    }
12  ],
13  "credentialStatus": {
14    "id": "urn:revocation-registry:tm:T96PMDpPulDvBwMjKcZ3P2",
15    "revocationListCredential": "urn:revocation-registry:tm:T96PMDpPulDvBwMjKcZ3P2",
16    "revocationListIndex": "2",
17    "type": "RevocationList2020Status"
18  },
19  "credentialSubject": {
20    "birthdate": "1998-08-28",
21    "documentNumber": "542426814",
22    "expiryDate": "2025-01-01T00:00:00Z",
23    "givenName": "John",
24    "id": "urn:uuid:8c417aaa55045d38b199f4abc448ef5",
25    "issuanceDate": "2022-09-29T12:42:11Z",
26    "issuingAuthority": "CO",
27    "issuingCountry": "US",
28    "lastName": "Doe"
29  },
30  "id": "urn:uuid:7c855b6437084fee8888b0870a46478",
31  "issuanceDate": "2022-09-29T12:42:11Z",
32  "issuer": {
33    "did": "did:key:z6MkqVYyQ4bZDh5b0_R-hTnaMEVYq4ben5Q7wa1Q",
34    "proof": {
35      "created": "2022-09-29T12:42:11Z",
36      "proofPurpose": "assertionMethod",
37      "proofValue": "scM@pkmzmgZ25PPGK9ccq/ge2htcn8s1/pYtXG1ZtZ2kavLfoEKUfV"
38    }
39  }
40 }

credential-2.json > {} @context > 2
1 {
2   "context": [
3     "https://www.w3.org/2018/credentials/v1",
4     "https://w3id.org/bbs/v1",
5     "https://schema.trinsic.cloud/tm/iso18013-drivers-license/context"
6   ],
7   "credentialSchema": [
8     {
9       "id": "https://schema.trinsic.cloud/tm/iso18013-drivers-license",
10      "type": "JsonSchemaValidator2018"
11    }
12  ],
13  "credentialStatus": {
14    "id": "urn:revocation-registry:tm:F2h6qwohG2DhB7yJfLW1g",
15    "revocationListCredential": "urn:revocation-registry:tm:F2h6qwohG2DhB7yJfLW1g",
16    "revocationListIndex": "3",
17    "type": "RevocationList2020Status"
18  },
19  "credentialSubject": {
20    "birthdate": "1998-08-28",
21    "documentNumber": "542426814",
22    "expiryDate": "2025-01-01T00:00:00Z",
23    "givenName": "John",
24    "id": "urn:uuid:8c834a1257df44a6bdf796fb0e2cf01",
25    "issuanceDate": "2022-09-29T12:43:07Z",
26    "issuingAuthority": "CO",
27    "issuingCountry": "US",
28    "lastName": "Doe"
29  },
30  "id": "urn:uuid:48cd3b8e5cf04c01a1a271833b6c942e",
31  "issuanceDate": "2022-09-29T12:43:07Z",
32  "issuer": {
33    "did": "did:key:z6MkqVYyQ4bZDh5b0_R-hTnaMEVYq4ben5Q7wa1Q",
34    "proof": {
35      "created": "2022-09-29T12:43:07Z",
36      "proofPurpose": "assertionMethod",
37      "proofValue": "pVJw/LLzWry08UrtK5a3n261AbJcn9Y14DM/4z7FR00p0wFpruyLj1B5qfXo1JNK"
38    }
39  }
40 }
  
```

- two VC demos, good and bad actor issuers and with and without governance for verification

```

credential-1.json > {} credentialSubject
1 {
2   "@context": [
3     "https://www.w3.org/2018/credentials/v1",
4     "https://w3id.org/bbs/v1",
5     "https://schema.trinsic.cloud/tm/iso18013-drivers-license/contex"
6   ],
7   "credentialSchema": {
8     {
9       "id": "https://schema.trinsic.cloud/tm/iso18013-drivers-licen"
10      "type": "JsonSchemaValidator2018"
11    }
12  },
13  "credentialStatus": {
14    {
15      "id": "urn:revocation-registry:tm:FzH6qowohG2DMxb7yJfLWi#3",
16      "revocationListCredential": "urn:revocation-registry:tm:FzH6qowohG2DMxb7yJfLWi#3"
17    }
18  }
19 }

```

```

credential-2.json > {}
1 {
2   "credentialStatus": {
3     {
4       "id": "urn:revocation-registry:tm:FzH6qowohG2DMxb7yJfLWi#3",
5       "revocationListCredential": "urn:revocation-registry:tm:FzH6qowohG2DMxb7yJfLWi#3",
6       "revocationListIndex": "3",
7       "type": "RevocationList2020Status"
8     }
9   },
10  "credentialSubject": {
11    {
12      "birthDate": "1998-08-28",
13      "documentNumber": "542426814",
14      "expiryDate": "2025-01-01T00:00:00Z",
15      "givenName": "John",
16      "id": "urn:uuid:dc41f7aaa55045d38b199f4abc448ef5",
17      "issueDate": "2020-01-01T00:00:00Z",
18      "issuingAuthority": "CO",
19      "issuingCountry": "US",
20      "lastName": "Doe",
21      "id": "urn:uuid:48ed3b0e5df04c01a1a271833b6e942e",
22      "issuanceDate": "2022-09-29T12:43:07.6501340Z",
23      "issuer": {
24        "did:ion:test:EiBZG7eihMPPfFFFe3YEus9JPMt516TygAq2G90Y6W",
25        "proof": {
26          "created": "2022-09-29T12:43:07Z",
27          "proofPurpose": "assertionMethod",
28          "type": "Ed25519Signature2018"
29        }
30      }
31    }
32  }
33 }

```

```

~/tm → trinsic vc verify-proof --proof-document ./tr-credential-2.json

```

```

is valid → "true"
validation results → {
  "CredentialStatus": {
    "is_valid": true,
    "messages": []
  },
  "IssuerIsSigner": {
    "is_valid": true,
    "messages": []
  },
  "SchemaConformance": {
    "is_valid": true,
    "messages": []
  },
  "SignatureVerification": {
    "is_valid": true,
    "messages": []
  }
}

```

```

credential-1.json > {} credentialSubject
1 {
2   "@context": [
3     "https://www.w3.org/2018/credentials/v1",
4     "https://w3id.org/bbs/v1",
5     "https://schema.trinsic.cloud/tm/iso18013-drivers-license/contex"
6   ],
7   "credentialSchema": {
8     {
9       "id": "https://schema.trinsic.cloud/tm/iso18013-drivers-licen"
10      "type": "JsonSchemaValidator2018"
11    }
12  },
13  "credentialStatus": {
14    {
15      "id": "urn:revocation-registry:tm:FzH6qowohG2DMxb7yJfLWi#3",
16      "revocationListCredential": "urn:revocation-registry:tm:FzH6qowohG2DMxb7yJfLWi#3"
17    }
18  }
19 }

```

```

credential-2.json > {}
1 {
2   "credentialStatus": {
3     {
4       "id": "urn:revocation-registry:tm:FzH6qowohG2DMxb7yJfLWi#3",
5       "revocationListCredential": "urn:revocation-registry:tm:FzH6qowohG2DMxb7yJfLWi#3",
6       "revocationListIndex": "3",
7       "type": "RevocationList2020Status"
8     }
9   },
10  "credentialSubject": {
11    {
12      "birthDate": "1998-08-28",
13      "documentNumber": "542426814",
14      "expiryDate": "2025-01-01T00:00:00Z",
15      "givenName": "John",
16      "id": "urn:uuid:dc41f7aaa55045d38b199f4abc448ef5",
17      "issueDate": "2020-01-01T00:00:00Z",
18      "issuingAuthority": "CO",
19      "issuingCountry": "US",
20      "lastName": "Doe",
21      "id": "urn:uuid:48ed3b0e5df04c01a1a271833b6e942e",
22      "issuanceDate": "2022-09-29T12:43:07.6501340Z",
23      "issuer": {
24        "did:ion:test:EiBZG7eihMPPfFFFe3YEus9JPMt516TygAq2G90Y6W",
25        "proof": {
26          "created": "2022-09-29T12:43:07Z",
27          "proofPurpose": "assertionMethod",
28          "type": "Ed25519Signature2018"
29        }
30      }
31    }
32  }
33 }

```

```

~/tm → trinsic vc issue

```

- Demo on good actor first confirms credentials are valid, not revoked, schema conforms, valid issuer, and signature verified for both good and bad actors.
- All the checks pass because there is nothing wrong with both credentials.
- How do you know? Trust Registry solves this.
- Issue a credential with governance information encoded.
- There is an issuer field extension to the VC, in the credential - not just the issuer DID. It includes claims of which governance framework and trust registry it belongs to.

```

tr-credential-1.json
{
  "expiryDate": "2025-01-01T00:00:00Z",
  "givenName": "John",
  "id": "urn:uuid:758535cb7e784ab5b24578e40a710f83",
  "issueDate": "2020-01-01T00:00:00Z",
  "issuingAuthority": "CO",
  "issuingCountry": "US",
  "lastName": "Doe",
  "id": "urn:uuid:608ed99b2c9c476fb676753e4e2ea302",
  "issuanceDate": "2022-09-29T12:42:35.6784189Z",
  "issuer": {
    "governanceFramework": "https://example.com/authorized-issuers",
    "id": "did:ion:test:EiC0qiV_y1waDQZL0h5bQ_R--hTmaWEyIq4ben5Q7WaiQ",
    "trustRegistry": "urn:reg:tm:e827627085c44178ab2573c7c1cc",
    "type": "AuthoritativeMember"
  },
  "proof": {
    "created": "2022-09-29T12:42:35Z",
    "proofPurpose": "assertionMethod",
    "proofValue": "r3IL5RHPsuugM0elnN/fjAyilLn0oyUc5nAbZ2y8XLC",
    "type": "BbsBlsSignature2020",
    "verificationMethod": "did:ion:test:EiC0qiV_y1waDQZL0h5bQ_R--hTmaWEyIq4ben5Q7WaiQ",
    "type": [
      "VerifiableCredential",
      "Iso18013DriversLicense"
    ]
  }
}

tr-credential-2.json
{
  "@context": [
    "https://www.w3.org/2018/credentials/v1",
    "https://w3id.org/bbs/v1",
    "https://schema.trinsic.cloud/tm/iso18013-drivers-license/context",
    "https://trinsic-id.github.io/vc-ext-governance/contexts/trust-f"
  ],
  "credentialSchema": {
    "id": "https://schema.trinsic.cloud/tm/iso18013-drivers-licens",
    "type": "JsonSchemaValidator2018"
  },
  "credentialStatus": {
    "id": "urn:revocation-registry:tm:FzhH6qwohG2DMxb7yJfLw1#2",
    "revocationListCredential": "urn:revocation-registry:tm:FzhH6qwohG2DMxb7yJfLw1#2",
    "revocationListIndex": "2",
    "type": "RevocationList2020Status"
  },
  "credentialSubject": {
    "birthDate": "1998-08-28",
    "documentNumber": "542426814",
    "expiryDate": "2025-01-01T00:00:00Z",
    "givenName": "John",
    "id": "urn:uuid:3afc5355f1fa4a978c61ad2fda2a6a43",
    "issueDate": "2020-01-01T00:00:00Z",
    "issuingAuthority": "CO",
    "issuingCountry": "US",
    "lastName": "Doe"
  }
}

tr-credential-1.json
{
  "issueDate": "2020-01-01T00:00:00Z",
  "issuingAuthority": "CO",
  "issuingCountry": "US",
  "lastName": "Doe",
  "id": "urn:uuid:608ed99b2c9c476fb676753e4e2ea302",
  "issuanceDate": "2022-09-29T12:42:35.6784189Z",
  "issuer": {
    "governanceFramework": "https://example.com/authorized-issuers",
    "id": "did:ion:test:EiC0qiV_y1waDQZL0h5bQ_R--hTmaWEyIq4ben5Q7WaiQ",
    "trustRegistry": "urn:reg:tm:e827627085c44178ab2573c7c1cc",
    "type": "AuthoritativeMember"
  },
  "proof": {
    "created": "2022-09-29T12:42:35Z",
    "proofPurpose": "assertionMethod",
    "proofValue": "r3IL5RHPsuugM0elnN/fjAyilLn0oyUc5nAbZ2y8XLC",
    "type": "BbsBlsSignature2020",
    "verificationMethod": "did:ion:test:EiC0qiV_y1waDQZL0h5bQ_R--hTmaWEyIq4ben5Q7WaiQ",
    "type": [
      "VerifiableCredential",
      "Iso18013DriversLicense"
    ]
  }
}

tr-credential-2.json
{
  "givenName": "John",
  "id": "urn:uuid:3afc5355f1fa4a978c61ad2fda2a6a43",
  "issueDate": "2020-01-01T00:00:00Z",
  "issuingAuthority": "CO",
  "issuingCountry": "US",
  "lastName": "Doe",
  "id": "urn:uuid:a4da670c8eb04eaf8602a64276e1d5ed",
  "type": "VerifiableCredential"
}

TERMINAL
~/tm → trinsic trust-registry get-membership-status `
>> -s https://schema.trinsic.cloud/tm/iso18013-drivers-license `
>> -f https://example.com/authorized-issuers `
>> -d did:ion:test:EiC0qiV_y1waDQZL0h5bQ_R--hTmaWEyIq4ben5Q7WaiQ
ok
status → "Current"
~/tm → trinsic trust-registry get-membership-status `
>> -s https://schema.trinsic.cloud/tm/iso18013-drivers-license `
>> -f https://example.com/authorized-issuers `
>> -d did:ion:test:EiBZG7eihMFPFFFFe3YEus9JPNT516TygAq2690Y6MnR1g
ok
status → "NotFound"
~/tm → trinsic trust-registry get-membership-status `
>> -s https://schema.trinsic.cloud/tm/iso18013-drivers-license `
>> -f https://example.com/authorized-issuers `
>> -d did:ion:test:EiBZG7eihMFPFFFFe3YEus9

```

Now verification doesn't work for the bad actor because the trust registry membership fails (an additional check)

- Is there a list of EFGs and how do you discover them?
  - No list of Ecosystem Governance Frameworks that exist that someone maintains
  - Presumably it would be published on the website
- What controls are required to prevent bad actors from adding records to trust registries?
  - Depends on security and design of trust registries -it depends on who manages the registry.
- How will a standard schema be adopted for a given verifiable credential? Who drives it?
  - Community, adoption, large corporations, open standards e.g. mDL

- Schemas - will be interesting how communities adopt schemas. Centralizing and standardizing will develop
- Q. What's next for your project? Where is it going in the next six months or so?
  - Better management tools.
  - Adding privacy preserving trust registries, especially based on accumulators (useful also for revocation)
- Q. What do you hope to learn early in deployment?
  - How customers use the product
- Q. How much do various credential ecosystem parties have to do to extend what they do to include the registry?
  - minimal - current trust registry is membership based, just add and remove members
  - extensions possible
  - e.g. can be member of multiple governance frameworks/trust registries
- Concerns - correlation attacks, e.g. info leaks from the issuer identity

**Admin Reminder** : remember to re-subscribe to new meeting calendar

If you want your name on the invite, reach out to [Elisa Trevino](#) (on slack), she will put your name in the calendar invite to make sure that the invite is sent out each time.

## Coming up

- Resuming regular schedule Sept 15
- Next presenter, Sept 29: Trinsic Trust Registry solution