YANG Normalization for Equivalence Evaluation

IETF Hackathon

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Problem Statement

- YANG-modeled data travels in XML, JSON and CBOR
  - Even though there are existing canonicalization procedures, equivalent data is serialized differently: ordering, conventions and encoding
- Different bytes for the same information
  - Different hashes, fingerprints and signatures
- Direct comparison cannot tell whether two representations are equivalent
- Use cases: state comparison, data sync, deduplication, provenance signatures, multi-vendor interoperability

What We Brought

- **A schema-independent normalization prototype.**
  - Parses XML, JSON and CBOR YANG-modeled data.
  - Maps each input to a common AST.
  - Produces deterministic representation that can be compared or hashed.

Implementation A serializes (XML):

```
<interfaces
  xmlns="urn:ietf:params:xml:ns:yang:ietf-
interfaces"
  xmlns:iana-if-
type="urn:ietf:params:xml:ns:yang:iana-if-
type">
  <interface>
    <name>eth0</name>
    <type>iana-if-type:ethernetCsmacd</type>
    <enabled>true</enabled>
    <mtu>1500</mtu>
  </interface>
</interfaces>
```

Implementation B serializes (JSON):

```
{
  "ietf-interfaces:interfaces": {
    "interface": [
      {
        "mtu": 1500,
        "type": "iana-if-type:ethernetCsmacd",
        "name": "eth0",
        "enabled": true
      }
    ]
  }
}
```

Final AST representation

```
interfaces
└─ interface
   ├─ enabled = true
   ├─ mtu = 1500
   ├─ name = eth0
   └─ type = iana-if-
type:ethernetCsmacd
```

What We Achieved Here

- Bring the first RI, aligned with draft -00, to be presented at the OPSAWG session
- Without schema information, leaf values remain text; the normalizer cannot semantically resolve identityref prefixes, so we have to take care of this.
- Draft Contacts:
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