Open Standards for Context Information Management

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Digitization is starting to gravitate around context information. Information and its context which describes what is going on, where, when, why ...
Standards for Context Information Management

- **NGSI LD** is a simple yet powerful open API for Context Information Management → Published as **ETSI Specification** (April 2018)

- A RESTful API using JSON so any web/backend developer gets quickly used to it

- Yet powerful: It supports geo-queries, temporal queries and Linked Data (JSON-LD)

Context Information might come from different sources not only IoT
Information Model (as UML) – NGSI LD

NGSI-LD Entity
  + id : URI

NGSI-LD Relationship
  + relationshipId: URI

NGSI-LD Property
  + propertyId: URI

NGSI-LD Value
  + dataType: URI

has Relationship

has Subject

has Object

has Property

has Value
Information Model - Highlights

- **NGSI Entity** → Physical or virtual object.
  - It has (one) **Entity Type**.
  - Uniquely identified by an **Entity Id** (URI)
- Entity has zero or more **attributes** identified by a **name**
  - **Property** --> Static or dynamic characteristic of an entity
    - GeoProperty (geospatial context)
    - TemporalProperty (temporal context)
  - **Relationship** → Association with a Linked entity (unidirectional)
- Properties have a **value**
  - An NGSI value can be a single value (Number, String, boolean), or complex (Array, Structured Value)
- Relationships have an **object**
  - A URI which points to another entity (target of the relationship). Target can be a collection.
Information Model – Highlights (II)

- Cross-Domain, core properties for giving context to your information
  - location → Geospatial location, encoded as GeoJSON.
  - observedAt → Observation timestamp, encoded as ISO8601.
  - createdAt → Creation timestamp (of entity, attribute).
  - modifiedAt → Update timestamp (of entity, attribute).
  - unitCode → Units of measurement, encoded as mandated by UN/CEFACT.

- Recommended practice
  - Use URIs to identify your entities.
  - A URN schema is provided off-the-shelf. It enables to know in advance what entity type an id refers to
    - urn:ngsi-ld:<Entity_Type_Name>:<Entity_Identification_String>
Example

Source: ETSI Specification
JSON-LD (RDF friendly) representation (a.k.a. NGSI-LD)

```
{
  "id": "urn:ngsi-ld:Vehicle:A4567",
  "type": "Vehicle",
  "brandName": {
    "type": "Property",
    "value": "Mercedes"
  },
  "isParked": {
    "type": "Relationship",
    "object": "urn:ngsi-ld:OffStreetParking:Downtown1",
    "observedAt": "2017-07-29T12:00:04",
    "providedBy": {
      "type": "Relationship",
      "object": "urn:ngsi-ld:Person:Bob"
    }
  },
  "@context": [
    "http://uri.etsi.org/ngsi-ld/coreContext.jsonld",
    "http://example.org/cim/commonTerms.jsonld",
    "http://example.org/cim/vehicle.jsonld",
    "http://example.org/cim/parking.jsonld"
  ]
}
```

```
{
  "id": "urn:ngsi-ld:OffStreetParking:Downtown1",
  "type": "OffStreetParking",
  "availableSpotNumber": {
    "type": "Property",
    "value": 121,
    "observedAt": "2017-07-29T12:05:02",
    "reliability": {
      "type": "Property",
      "value": 0.7
    }
  },
  "providedBy": {
    "type": "Relationship",
    "object": "urn:ngsi-ld:Camera:C1"
  },
  "location": {
    "type": "GeoProperty",
    "value": {
      "type": "Point",
      "coordinates": [-8.5, 41.2]
    }
  },
  "@context": [
    "http://uri.etsi.org/ngsi-ld/coreContext.jsonld",
    "http://example.org/cim/parking.jsonld"
  ]
}
```
Thank you!

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