KDI : Knowledge and Data Integration

Entity Markup Language

Entity-centric representations

W6.L11.M4.T11.1.2

Contents

Contents

Top level view

There are possibly 2 kind of representation of the KG:

Relation centric

- RDF (all serializations)
- Triple store
- Graph Databases

Node centric

- JSON-LD
- Document NoSQL DB
- RDBMS
- Graph Databases

Relation-centric

- Best for exploiting relations;
- difficult to predict cardinality of the queries;
- less natural way to describe the world;
- easier to implement.

Node-centric

- Good for exploiting relations;
- more efficient query mechanism;
- closer to our human model to describe the world;
- harder to implement.

Contents

JSON-LD

It is a W3C standard (https://www.w3.org/TR/json-ld11/) and it is a node-centric format, alternative to RDF.
Since is JSON it can be used together with lots of tools written for it, not specific to Linked Data.

Listing 1: JSON-LD example

```
{
  "@context": "context.jsonld",
  "name": "Manu Sporny",
  "homepage": "http://manu.sporny.org/",
  "image": "http://manu.sporny.org/images/manu.png"
}
```

JSON-LD - attributes

As visible in the Listing 1 example there is a `"@context"` property.

All properties starting with the `"@"` symbol are *special properties* used to define meta attribute of the element we are defining.
In this case `@context` is defining a set of rules (or, as in this case, where to find them) used to correctly interpret the data.

Another very useful and common field is `@id`, which is used to uniquely identify the node, both in case of IRI and blank nodes.

Contents

EML

Entity Markup Language is a simplification of JSON-LD: it provides just one single functionality more: *language independent property names*. This is important because we cannot formally define something with an informal language (and every natural language is non-formal).

EML is just representing entities (instances) and cannot be used to represent ETypes (classes).

It uses UKC IDs to name properties instead of NL text:

Example

If the UKC Concept representing "name" has Id = 2 , instead of defining `["name": "Alessio"]` the value will be `[2: "Alessio"]`

EML Example


```
[{
    "provenance": "StarLinker import @Mon Nov 16 10:18:31 GMT 2020",
    "attributes": {
        "1280751": [-350092800000],
        "1280695": ["IEHR001"],
        "1280691": ["Masked"],
        "9398058": ["tel:+39000000000"],
        "9300035": [6786],
        "39085": ["http://www.ftgm.it/patient/IEHR001"],
        "9398056": ["Via Matteotti 16, 56011, Pisa, IT"]
    },
    "type": 1127516
}]
```

EML Schema

Listing 2: EML schema

```
{
    "$ref": "/definitions/Entity",
    "definitions": {
        "Attribute": {
            "additionalProperties": false,
            "id": "/definitions/Attribute",
            "patternProperties": {
                "^\\d+$": {
                    "items": {
                        "$ref": "/definitions/Value"
                    },
                    "type": "array"
                }
            },
            "type": "object"
        },
        "Entity": {
            "additionalProperties": false,
            "id": "/definitions/Entity",
            "properties": {
                "globalId": {
                    "type": "integer"
                },
                "originalId": {
                    "type": "integer"
                },
                "type": {
                    "type": "integer"
                },
                "attributes": {
                    "$ref": "/definitions/Attribute"
                }
            },
            "required": [
                "type",
                "originalId"
            ],
            "type": "object"
        },
        "Value": {
            "id": "/definitions/Value",
            "properties": {
                "languageCode": {
                    "type": "string"
                },
                "value": {
                    "oneOf": [
                        {
                            "type": ["number", "string"]
                        },
                        {
                            "$ref": "/definitions/Entity"
                        }
                    ]
                }
            },
            "required": [
                "value"
            ],
            "type": "object"
        }
    }
}
```

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