How context information and interoperability can change smart cities' technology and business
Hello, Venice!

Ricardo Vitorino
Smart Cities R&I Manager at Ubiwhere
rvitorino@ubiwhere.com

www.ubiwhere.com
Founded in 2007, Ubiwhere is focused on Research, Development and Innovation of software-based solutions in the areas of Smart Cities, Telecom and Future Internet, and New Technologies.

We have the innate desire of changing the World. That's why we create, design and develop solutions that improve people's life. Day by day, our multi-skilled team works to bridge the existing gaps in the market.

— We are here for the long run! Let’s start?
We believe that great partners empower great ideas and build the best business.

Meet some of them.
Can you imagine having your city as a single, integrated system?
We can!
And so will you.
Meet ETSI’s ISG CIM

Industry Specification Group for cross-cutting Context Information Management
ETSI ISG CIM: Mission

Make it easier for END-USERS and CITY DATABASES and IoT internet-of-things and third-party APPS to exchange INFO.

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Context Information Management – Data AND Meaning

A.I.

User Apps

Applications

Applications

Applications

IoT

Context Information Ontologies

Context Information Ontologies

Context Information Ontologies

Open Data

Proprietary Data

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Goals and simplicity of CIM

• Exchange information between any two systems
• Keep context information and relationships with data
• Minimal complexity (yet as much as really needed)
• Attractive to the development community
• Adaptive to security and privacy requirements (GDPR, ENISA, etc.)

Practical Assumptions

• Federated architecture
• Linked Data compliance
• Query & notification in same API
Information-centric with developer-friendly NGSI-LD

NGSI-LD Advantages
- Information-centric
- JSON-LD syntax
- Joining verticals

Context Information Management Layer

Machine Reasoning Systems

User Apps

IoT

Open Data

A.I.
Information-centric with developer-friendly NGSI-LD

Machine Reasoning Systems
- A.I.

APPs

NGSI-LD Advantages
- information-centric
- JSON-LD syntax
- joining verticals

EXAMPLE: Citizen Complaints Photo-App Application

User Apps

Information Systems

APP

Context Information Management

Data Publication Platforms

Open Data

Proprietary Data

IoT

Wi-Fi

5G

LPWAN

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MESSAGES: Using JSON-LD for easier integration example

```json
{
  "id": "urn:ngsi-ld:Vehicle:A4567",
  "type": "Vehicle",
  "brandName": {
    "type": "Property",
    "value": "Mercedes"
  },
  "inAccident": {
    "type": "Relationship",
    "object": "urn:ngsi-ld:SmartLamppost:Downtown1",
    "observedAt": "2019-05-29T12:14:55Z",
    "providedBy": {
      "type": "Relationship",
      "object": "urn:ngsi-ld:Org:Officer123"
    }
  }
}
```

"@context": [
  "http://example.org/vehicle/my-user-terms-context.jsonld"
]
Introduction in 9 Sections

- ETSI ISG CIM Mission: link up all data sources
- How info-exchange can help cities
- How can all THAT Information be handled?
- Example: The happy policeman
- Information Model and Query Language
- Architectures
- Problem: A babel of Ontologies
- Not alone!
- NGSI-LD CURRENT STATUS
Documentation available: Whitepaper

Whitepaper available to explain main concepts of NGSI-LD

Fills the gap between brief press releases and detailed specification documents for NGSI-LD and related use cases.
Documentation available: Specification and Use Cases

NGSI-LD API

USE CASES
Common Smart City Use Cases

<table>
<thead>
<tr>
<th>Smart homes</th>
<th>Smart parking lot</th>
<th>Healthcare</th>
<th>Weather &amp; water systems</th>
<th>Transportation &amp; Vehicular traffic</th>
<th>Environmental pollution</th>
<th>Surveillance Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand Response</td>
<td>Number of cars</td>
<td>Tracking</td>
<td>Weather condition</td>
<td>Camera monitoring</td>
<td>Green house gas monitoring</td>
<td>CCTV</td>
</tr>
<tr>
<td>Fire detection</td>
<td>Departure &amp; arrivals</td>
<td>Identification</td>
<td>Water quality</td>
<td>Environment monitoring</td>
<td>Energy efficiency monitoring</td>
<td>Violent detection</td>
</tr>
<tr>
<td>Temperature monitoring</td>
<td>Environment Monitoring</td>
<td>Data gathering</td>
<td>Water leakage</td>
<td>Travel scheduling</td>
<td>Renewable energy usage</td>
<td>Public place monitoring</td>
</tr>
<tr>
<td>Security systems</td>
<td>Mobile ticketing</td>
<td>Sensing</td>
<td>Water level</td>
<td>Traffic jam reduction</td>
<td>Air quality monitoring</td>
<td>People &amp; object tracking</td>
</tr>
<tr>
<td>Social network supporting</td>
<td>Traffic congestion control</td>
<td></td>
<td>Water contamination</td>
<td>Assisted driving</td>
<td>Noise pollution monitoring</td>
<td>Traffic police</td>
</tr>
</tbody>
</table>

“Review of Smart Cities based on IoT”. [https://pdfs.semanticscholar.org/3f4b/5b92464281610010c0c4264d62893567e03c.pdf](https://pdfs.semanticscholar.org/3f4b/5b92464281610010c0c4264d62893567e03c.pdf) Energies 2017, 10, 421
Common Smart City Use Cases

So many Smart City services...

Yet so many issues in enabling exchange of meaningful and usable information.

Do not wait for perfection!

Get started: collaborating, improving, standardising.
**Next steps**

Let’s have a coffee and talk! (including tomorrow’s **world café**)

Contact [ngsi-ld@etsi.org](mailto:ngsi-ld@etsi.org) to arrange a introduction to the work

Any legal entity is welcome to join ETSI ISG CIM
[**CIM Member Agreement**](mailto:ngsi-ld@etsi.org) (if already ETSI member)
[**CIM Participant Agreement**](mailto:ngsi-ld@etsi.org) (any legal entity can join too)
Thank you!

Ricardo Vitorino (rvitorino@ubiwhere.com)

- Smart Cities R&I Manager at Ubiwhere
- Vice-Chairman of ETSI’s ISG CIM
- Collaborating in ETSI’s ISG CDP (City Digital Profile)
- Actively collaborating in ETSI’s Smart City Specialist Task Force (STF):
  
  Smart cities and communities to meet citizen and consumer requirements

  ➡️ https://standards4citizens.etsi.org