Towards Enabling Internet-Scale Context-as-a-Service: A Position Paper

Alexandru SORICI, Andrei OLARU, Adina Magda FLOREA
University Politehnica of Bucharest
What is Context-Awareness?

Context “is any information that can be used to characterize the situation of an entity. An entity is a person, place, or object that is considered relevant to the interaction between a user and an application, including the user and applications themselves” [1]

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“Context is the dressing of a focus” [2]


What is Context-Management

Getting the **relevant** context information from the provider to the consumer in a **meaningful** manner

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Provisioning and Deployment perspective:

- Search, Discoverability
- Control sharing of context
Sensing as a Service


Personal owners
Private/Public Organizations
Data Providers

Sensors and Sensor Owners

Sensor Publishers

Common Middleware
- Localized/Aggregated Analytics
- IoT Ecosystem
- Enable creation of new business models

Extended Service Providers

Sensor Data Consumers

Home Automation
Smart Environments
Smart Cities
Smart Agriculture
Logistics
...
Sensing as a Service - Scenario
Shortcomings in structuring context information

NGSI-LD\(^1\) and W3C ThingDescription\(^2\) model content *only* → no explicit information structuring

FI-WARE Context Management Architecture

- ContextBroker has no means to logically split managed context information
- Defines centralized flow
- Federation possible, pot cannot be automatized

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1 https://github.com/FIWARE/NGSI-LD_Experimental/blob/master/doc/NGSI-LD_Information_Model.md
2 https://www.w3.org/TR/wot-thing-description/
Position

We need **structure** to facilitate **search** and **discoverability**

We want to exploit the **typed relations** and **normative-dimension** of **Socio-Technical Networks**

The **structure** has to help determine:

- A logical, distributed partitioning for managing context information (*localize* as much as possible) which can be actively *joined*, *quitted*, *traversed*

- The normative/authorization dimension - how/when are applications allowed/obligated to interconnect to share context information
Structuring context info: ContextDimensions and ContextDomains
Sensing as a service: modeled
Conclusion

**Position:** large-scale context-as-a-service stands on **augmenting** models for representing context (e.g. ThingDescription) with **structure** of information organization which brings:

- Facilitated search/indexing
- Decentralized management and query routing
- Exploit the agent-based view to add normative dimension to context sharing