

ITU Kaleidoscope 2013
Building Sustainable Communities

Standard-based Publish-Subscribe Service Enabler for Social Applications and Augmented Reality Services



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Introduction

- ❑ Future Internet Public Private Partner initiative (funded by the EU Commission in 2010)
 - ❑ Use Case Projects (UCPs)
 - ❑ FI-WARE project: embraces all the Generic Enablers (GEs) commonly used by any UCP
- ❑ Publish / Subscribe: most required Generic Enabler



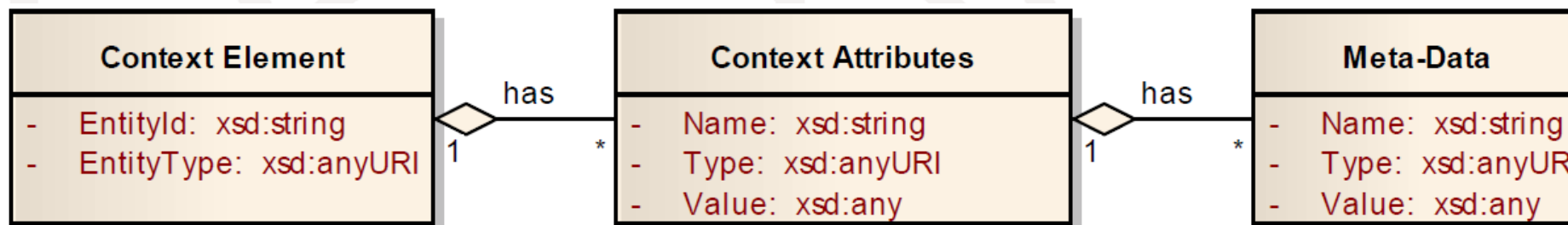
Generic Enabler Selection

- ❑ Standards Analyzed:
 - ❑ Industrial Open Standards
 - ❑ FI-WARE partners' solutions
- ❑ Criteria:
 - ❑ Implemented and used solutions
 - ❑ Simplicity
 - ❑ Heterogeneous devices
 - ❑ Different application domains

OMA NGSI Standard

- ❑ Selected Standard
- ❑ Main characteristics:
 - ❑ On-request and subscription-based information retrieval from providers (such as context data and events)
 - ❑ Allows the creation of a federation of brokers (scalability and flexibility to the final solution)

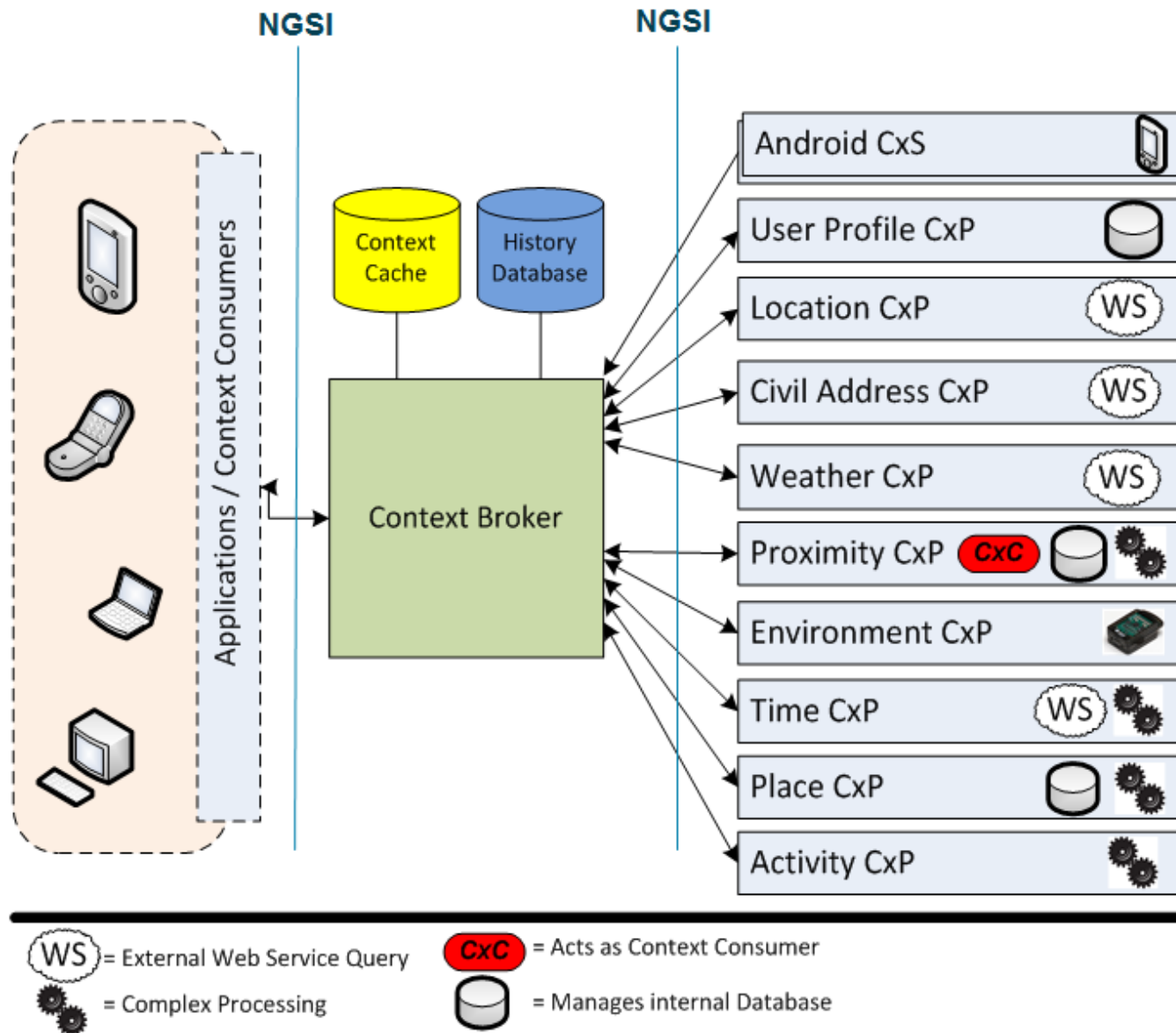
OMA's NGSI: data representation model



FI-WARE's NGSI RESTful binding

- ❑ No specific technological binding created within the OMA
- ❑ Based on XML standards and XSD schemas of the data resources parameters and interrogation methods
- ❑ Data handling through RESTful requests
 - ❑ Final solution follows Web service model

NGSI used with Broker



Publish/Subscribe GE: specification and architecture

- ❑ Based on:
 - ❑ Telecom Italia's Context Management Platform
 - ❑ OMA's NGSI architecture and API specifications
- ❑ ContextML/CQL and FI-WARE's NGSI interfaces
- ❑ Available on the project's web site for virtually (IP-control) public use
<http://catalogue.fi-ware.eu/>

Publish/Subscribe GE: reference implementation

- Currently on development by Telecom Italia
- Includes two interfaces:
 - RESTlike ContextML/CQL
 - RESTful FI- WARE's NGSI
- Interfaces support comprehensive and extendable query and subscription mechanisms for data and context retrieval

RESTlike ContextML/CQL Interface

- Based on simple exchange of XML-based documents through HTTP requests (POST and GET)
- Already in use by Telecom Italia's applications for few years:
 - Context management
 - Context-aware applications and services
- Tested
- Stable

RESTful FI- WARE's NGSI Interface

- ❑ Still under development
- ❑ First release available in the project's test-bed
- ❑ Exposed via FI-WARE's GEs Catalogue <http://catalogue.fi-ware.eu/enablers/publishsubscribe-context-broker-context-awareness-platform/>
 - ❑ Publishes context information from data producers to the Publish/Subscribe broker that makes it available for retrieval by context consumers



4CaaS Cloud Platform

- ❑ <http://4caast.morfeo-project.org/>
Allows deployment and execution of services/applications that use platform's Publish/Subscribe Service Enabler (Context as a Service/CaaS)
- ❑ Context Broker
 - ❑ Integrated into the cloud access control, provisioning, monitoring and charging subsystems
 - ❑ Is the core as a native Service Enabler

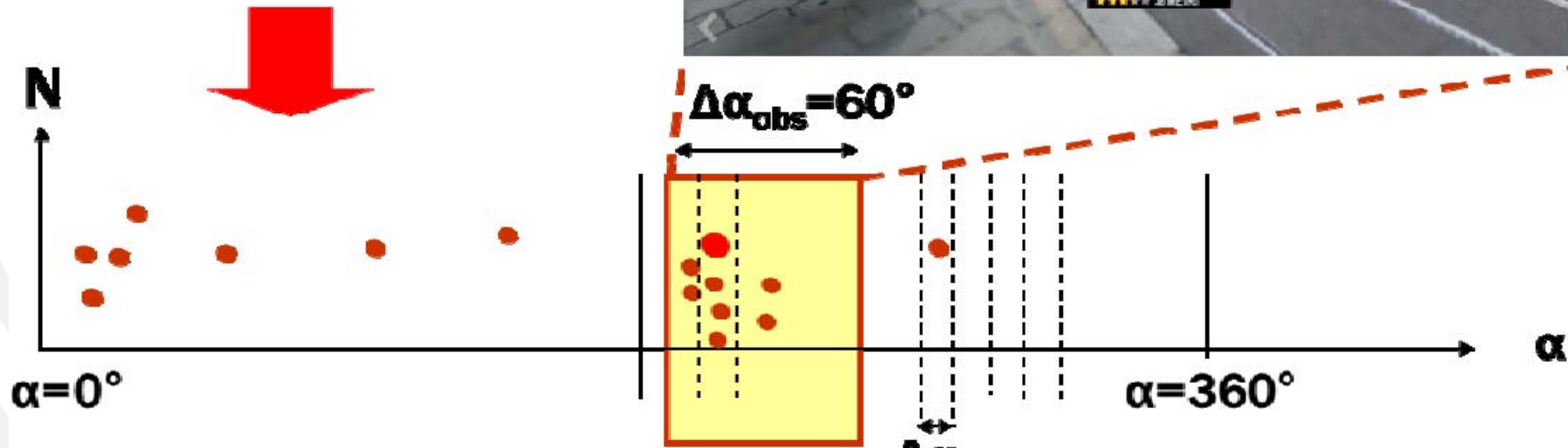
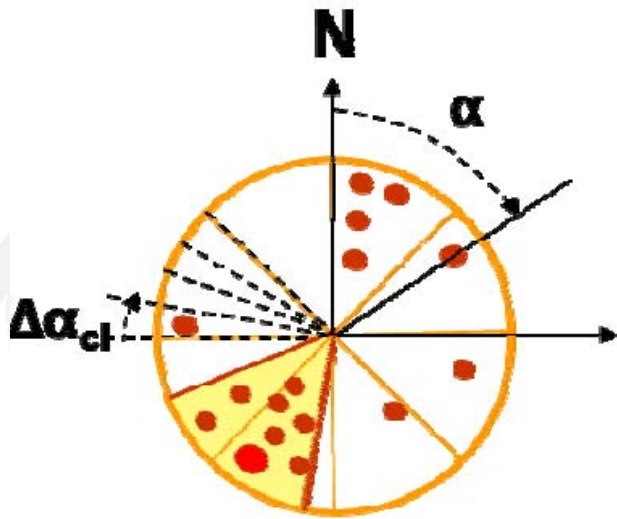
Social Relevant Applications

- ❑ 2 reference prototypes (many others come for Expo'15 Italy/Milan, Telecom Italia is a technological partner)
- ❑ Development by Telecom Italia
- ❑ Demonstrate the potential and advantages of the FI-WARE implementation and 4CaaS integration of the OMA's NGSI as Context Service Enabler

Augmented Reality (AR)

- ❑ Target
 - ❑ Mobile users having a smartphone with camera
- ❑ Goal
 - ❑ Provide an augmented view of real-life objects to the user
- ❑ Operation
 - ❑ Mobile user watches surrounding objects through the smartphone's screen
 - ❑ Related information associated to the objects, is shown graphically through layers in real-time

AR: Client application



Augmented Reality

- ❑ Information criteria
 - ❑ Mobile user's location
 - ❑ Preferences
 - ❑ Social relationships
 - ❑ Others
- ❑ Use-cases
 - ❑ Tourism
 - ❑ Find a restaurant
 - ❑ Locate friends
 - ❑ Many others ...

AR: Architectural components

- ❑ Augmented Reality Content Server (ARCS)
 - ❑ Manages geo-tagged information, mobile users' preferences, social information, user-generated content
- ❑ Client Application
 - ❑ Gathers data from the ARCS
 - ❑ Renders the graphical augmented view
 - ❑ Content generation

Social Reading

- ❑ Target
 - ❑ Mobile users with a smartphone
- ❑ Goal
 - ❑ Enhance reading experiences by creating a social community around the reader of eBooks
- ❑ Operation
 - ❑ While reading and eBook, the user has the possibility to annotate or comment a piece of text or paragraph to be shared with the community or Social Networks
- ❑ Community
 - ❑ Made up of service users
 - ❑ Relationships from popular social networks or by common reading interests
 - ❑ Schools

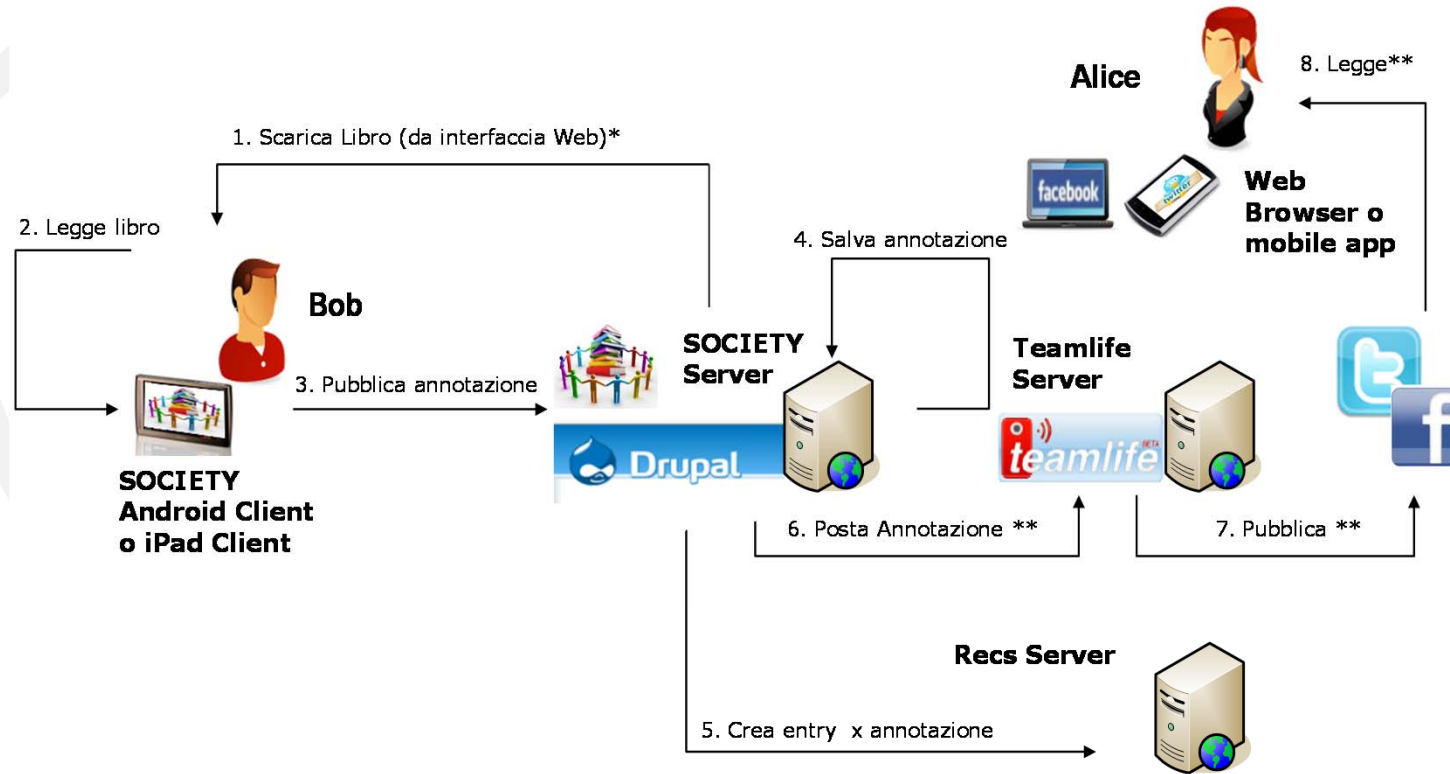
Social Reading (2)

- ❑ Semantic Enrichment
 - ❑ Automatic Semantic Annotator
 - ❑ Recognition of places, POIs, names and concepts inside the notes and comments
 - ❑ Enrichment from different Linked Object Data (LOD) sources
 - ❑ Most probable entity algorithm
 - ❑ Related content suggested to the user
- ❑ Non-semantic manual enrichment
 - ❑ Reader can attach multimedia content to the notes or comments created
 - ❑ From common web sources
 - ❑ From existing files on his mobile device
 - ❑ Graphical interface

SR: Accessibility features

- ❑ Blindness
 - ❑ Integrated text to speech (TTS)
 - ❑ Set of voices
- ❑ Vision problems
 - ❑ Font and size adjustment
 - ❑ eBooks' background color regulation
- ❑ Dyslexia
 - ❑ Currently under work

SR: Architecture



* La funzionalità di download nuovi libri da interfaccia web (1.) è disponibile solo da client Android

** Solo se ha scelto di condividerla anche su Facebook e/o Twitter

Future Work

- ❑ Generic Enabler
 - ❑ Full NGSI support mode
 - ❑ Integration with the FI Core Platform supporting
 - ❑ Integration into the FI-WARE security framework
 - ❑ Integrations with other important GEs, such as Big Data, Complex Event Processor, Multimedia Analysis, etc.)
 - ❑ Integration with FI-PPP UCPs

Future Work (2)

- ❑ Collaboration with OMA for a further accomplishment and improvement of the OMA NGSI Enabler specification.
- ❑ PubSubHubbub4 will be considered to create a federation model of the Publish/Subscribe context brokers
- ❑ Evaluation and eventual integration of standardized solutions such as XML and SIP presences, OMA Location
- ❑ Semantic enhancement of the Publish/Subscribe context broker following the OWL standard, SPARQL communication pattern and RDF data representation model

Conclusions

- ❑ **Real-life** big effort by industrial entities to bring their assets for the common usage of the **worldwide** open community
- ❑ Publish/Subscribe GE as an example solution openly defined and based on an open standard
- ❑ Service prototypes created and provided by Telecom Italia
- ❑ Services prototypes are impacting in both the user appealing and the **social** usefulness perspectives

Conclusions (2)

- ❑ Trials didn't show any performance bottlenecks or latency with limited number of customers and moderate platform usage
- ❑ Development, implementation and integration activities regarding this GE are still a work in progress
- ❑ Support of the European Research Program funding Future Internet Public Private Partnership Program, including the **FI-WARE** project

Thank you!

□ Questions?