Smart Data Models for cross-domain data sharing

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Digital Twins: the right approach for digitisation at multiple levels

Architecting Smart Solutions
- Smart Solution
- Digital Twin representation
- 3rd systems

Integrating systems and sharing data within organizations (system of systems)
- System 1
- System 3
- Digital Twin representation
- System 2
- System 4

Integrating systems and sharing data across organizations (data spaces)
- Smart City
- Smart Grid
- Smart Home
- Digital Twin representation
- Smart Building

Data Exchange API / Protocol + Data Models
Centralized IAM
Decentralized IAM
Trust Anchor + Marketplace
Common data models and formats: key for interoperability in Data Spaces
The Smart Data Models initiative

- **Goal:** provide a useful global “resource library” for developers

- **For each model:**
  - documentation in 6 languages
  - mapping (with validation schemas and examples) to DTDL and 4 serialization formats: JSON, JSON-LD, CSV, GeoJSON feat.

- **Principles:**
  - Agile process (6 weeks)
  - Implementation-driven
  - Cross-sector

- Defined data models rely on relevantly **adopted** standards (e.g., schema.org, SAREF, IEC CIM in Energy or UNE 178503 for Tourism) and contributions from real projects by the Community
Smart Data Models: domains and subjects

**DATA-MODELS**
- Guides for coding new data models
- Template for new data models and examples
- Directory for scripting tools to check data models
- Inventory of domains and data models
- Inventory of attributes and terms
- @Context for json-ld

**DOMAINS REPOSITORIES**
Readme pointing to the list of subjects
General info or shared resources

**SUBJECTS’ REPOSITORIES**
Readme pointing to the list of data models for the objects
Contributors.md
subject-schema.json

**LIFECYCLE MANAGEMENT REPOSITORIES**
- Incubated
- Harmonization

**DATA MODELS**
- README.md
- /doc/spec.md
- /examples
- schema.json
- Adopters
- LICENSE

**FIWARE**

Smart Data Models: domains and subjects

SMART WATER
- Subject 1 (sewage)

SMART CITIES
- Subject 2 (parking)

SMART ENVIRONMENT
- Subject 3 (weather)

CROSS SECTOR

SMART DESTINATIONS
- Subject 4 (Power Transformer)

SMART AGRIFOOD

SMART ENERGY

SMART MANUFACTURING

SMART AERONAUTICS

SMART ROBOTICS
## Smart Data Models: Current status

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<td><strong>1</strong></td>
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<td><strong>Smart Sensing</strong>*</td>
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<td><strong>12</strong></td>
<td><strong>Smart Health</strong></td>
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* Many sensors are specific from other domains but not counted there

Water 4, Environment 12, health 19, energy 5, cities 27, agrifood 1, robotics 1

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807 Official Smart Data Models
89 on the queue to be accepted

**Incubated**
- Transit Management
- Verifiable Credentials
- GS1 mapping
- OSLO (transport)
- Vineyards (Agri)
- CCVC
- Vessel
Contributors and dissemination

- 116 active contributors
- 226 contribution in data models
- 22 services to contributors in data models
- Contributors belong to 75 different organizations
- Terms available for search 18,271
- Documented adopters 130
- Every term in data models has an associated page https://smartdatamodels.org/term
- Google finds 1570 pages in smartdatamodels.org

Updated 20-6-22
Conclusions

- Adoption of a minimum but common set of data interoperability mechanisms is key in development of a strategy for digitisation:
  - system of systems approach within orgs
  - materialization of cross-sector data spaces
  - develop once, integrate plug&play

- Defining common data models is crucial but it’s not only about defining ontologies but also bring the answer to how data should be serialized when used together with APIs

- The Smart Data Models program meets the requirements to become the reference for developers:
  - open, community-driven
  - agile, implementation-driven
  - great momentum, growing fast
Sounds nice? - Contact us!

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