HSBooster Report: Standardisation for RDA TIGER

Contents

Glossary of Terms

CODATA	Committee on Data of the International Science Community
EOSC	European Open Science Cloud
FAIR	Findability, Accessibility, Interoperability, and Reuse
IG	Interest Group
ISC	International Science Council
NC	National Committee
NIST	National Institute of Standards and Technology
OECD	Organisation for Economic Co-operation and Development
RDA	Research Data Alliance
RDA TIGER	Research Data Alliance facilitation of Targeted International working Groups for EOSC-related Research solutions
SDO	Standards Developing Organisation
TC	Technical Committee
TCP	Technology Collaboration Programme
TG	Task Group
USA	United States of America
WG	Working Group

Introduction

The research data alliance (RDA)[1] is a community-driven initiative launched in 2013 with the goal of building the social and technical connections and engagements to enable the open sharing and re-used of data across various stakeholders and geographical boundaries to address the grand challenges of society.

Within RDA, is the Research Data Alliance facilitation of Targeted International working Groups for EOSC-related Research solutions (RDA TIGER)[2]. RDA TIGER is tasked with supporting the working groups (WGs) of RDA. For the purpose of this report, RDA TIGER has identified two WGs as candidates to explore their engagement with the standards process: the **wind energy community standards** WG and the **FAIR Mappings** WG.

This report aims to support the WGs identified by RDA TIGER in integrating, engaging, and contributing the WGs outputs to the standards community by presenting an introduction to the standards process and relevant considerations. This will be done by providing an introduction to the role of standardisation and its goals, potentially relevant standards bodies for the WGs, and potential challenges that may be faced in pursuing standardisation for the WGs. Specifically, this report aims to answer the questions of:

1. Which standards organisations would be good candidates for the identified WGs?
2. How could future RDA Interest Groups (IG) be targeted to work towards such a goal?

Overview of Selected RDA TIGER WGs

As modern industrial activity continues to embrace software-driven or monitored processes, products, or services at its heart, data has emerged as an essential commodity. Concretely, the accuracy, design, description, selection, representation, and exchange of data (and knowledge derived from the data) requires a consistent approach.

Intuitively, this leads to standardisation as a method to describe these activities. However, this presents a challenge for existing standards activities that have primarily focused on inter-operability as a function of the interfaces between communicating entities [1]. Even in cases where efforts for common data descriptions exist, they can lack specificity and the ability to formally reason about the data due to the use of human language in the descriptions [2].

In this space, RDA seeks to support the development and adoption of infrastructure that promotes this data (and the knowledge derived from it) in the context of research. Within RDA, several WGs are pursuing this agenda across different domains of interest addressing both context-specific and context-agnostic aspects. An introduction to the WGs identified for standardisation support is made below, however, common core concepts are first introduced:

Ontologies [3] are sets of concepts and categories and the relationships that exist between them. As ontologies are formally specified, as opposed to human language, they are increasingly popular as a domain of interest to enable the interoperability and exchange of **knowledge** and **data.**

Ontology Mappings [4] relate or *map* an element (e.g. concept) or subset of one or more ontologies to another. This has become necessary to leverage the increasing number of independently created ontologies. An example of a mapping is SSSOM [5].

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[1] https://www.rd-alliance.org/

[2] https://www.rd-alliance.org/rda-tiger/ ; RDA TIGER is funded by the European Union through grant 101094406

FAIR principles [6] advocate that digital assets are Findable, Accessible, Interoperable, and Reuseable. This supports the ability for data to be used with little or no human involvement, reused in new contexts, and further support the use of ontologies as standards for humans *and* machines. This aligns well with standardisation goals.

Wind Energy Community Standards WG

The wind energy community standards (WECS) WG[3] aims to reduce the data management overhead within and between organisations working within the wind energy industry. In addition to community building and stakeholder engagement, expected outputs of this group include:

- Landscape analysis of FAIR data in wind energy
- Case studies on the application of the FAIR data maturity model to identified open datasets
- Guideline on the improvement of FAIR data maturity in practice (for wind energy)
- Proposing or extending controlled vocabularies (for wind energy)
- Generation of a *wind energy FAIR Implementation Profile (FIP).*

The WECS WG is an offshoot of the IEA WIND Task 43, see below on *Relevant Standards Bodies for WGs*, that is specifically looking at wind energy (meta) data standardisation and a domain-specific FIP. Outputs of this WG are intended to feed back into the larger IEA Task 43 initiative.

FAIR Mappings WG

The FAIR Mappings (FM) WG[4] aims to address the fragmented landscape of ontology mappings by working towards common guidelines to make different types of mappings FAIR in the general case. In addition to community building and stakeholder engagement, expected outputs of this group include:

- Evaluation grid for the FAIRness of mappings and crosswalks (between ontologies)
- A methodology/framework of the mapping lifecycle
- A set of use case descriptions
- An ontology/classification of mappings
- Data models and meta-data related to the above
- A knowledge base

The Role of Standards

Put simply, the goal of standards is to provide a reliable basis for people (or machines) to share the same expectations about a process, product, or service. Accordingly, the main goals of standards[5] can be summarised as follows:

- **Fit For Purpose**: Ensuring that a process, product, or service has the ability to fulfil a defined purpose in a given context.
- **Interchangeability**: Ensuring that a process, product, or service may be used in place of another to fulfil some requirement.
- **Compatibility**: Ensuring that independently created processes, products, or services may be used together under specific conditions to fulfil relevant requirements without causing unnecessary interaction.
- **Health and Safety**: Identification and description of scenarios of normal and irregular use in which a process, product, or service may pose a threat to human life or property.

[3] https://www.rd-alliance.org/rationale/wind-energy-community-standards-wg/
[4] https://www.rd-alliance.org/rationale/fair-mappings-wg/
[5] https://www.unido.org/sites/default/files/2009-04/Role_of_standards_0.pdf

- **Optimality**: Ensuring that resources used in the creation or operation of a process, product, or service achieve maximal utilisation and reduce waste.
- **Communication and Understanding**: Ensuring clear, concise, and complete communication and communication forms for exchanges between different interacting parties.
- **Technology Transfer**: Ensuring precise, well-documented descriptions of a process, product, or service greatly reduces the barrier to their transfer and adoption.
- **Removal of Trade Barriers**: Ensuring precise, well-documented descriptions of a process, product, or service greatly reduces the barrier to trade across borders.

The Process of Standardisation

The process of creating or contributing to the elaboration of a standard is a multi-faceted challenge consisting of technological, social, human, industrial, economic, and legal factors. As such, substantial dedication and time is required in pursing standards of any kind. Additionally, it is important to note that the technical contributions to the standards process must be considered with equal weight against the effort required in engaging with relevant stakeholders within and outwith the standards community.

The following describes general considerations in the process of standardisation.

What to Standardise

Given the size and scope of the WECS and FM WGs, there are many things that can be standardised. Given the time and effort required in standardisation, it is very important to consider a strategy in terms of what to standardise and in what order.

Broadly speaking, this question can often be broken into:

- Use Cases that describe contexts and goals that a process, product, or service should achieve.
- The description of a process, product, or services.
- Hardware or software architectures that processes, products, or services should conform to.
- Interfaces or data/message formats that processes, products, or services should use to interoperate.
- Taxonomies or controlled vocabularies of terms that describe the meaning and use of languages to describe the above.
- Descriptive frameworks that describe processes, products, or services.
- Examples of mapping a standard to a specific use case.

For all points, this can be further broken or sub-divided into different levels ranging from the abstract and generic to the concrete and use case-specific. It is important to note that standards are often use case-driven; pre-emptively proposing a standard without an *existing* and concrete use case or use case categories can be challenging for standards members to support, especially industry members.

In both cases below, it is also important to consider the scope the domain being considered. Abstract and generalised high-level standards are possible but challenging to achieve. It is important to make well scoped decisions on how and what to standardise.

WECS WG

For the WECS WG, while all the work is of value to the community, the focus on controlled vocabularies, FAIR data model enhancement, and publishing guidelines most likely standardisation

candidates. The work on case studies and landscape are useful (necessary), but supporting standardisation activities.

Once this work is sufficiently mature and stable, engagement with the standards process would seem well aligned. Additionally, as the current work of the WG is to engagement with the community, the alignment of this work to and documentation of use cases is recommended. Planned outcomes of the WG possibly relevant for standardisation include:

- Enhancement of the "FAIR Data Maturity Model"
- Generation or enhancement of WEAVE[6], NEAT[7], or Task 42 WRA Data Model[8] controlled vocabularies.
- Guidelines for publishing structured metadata on the web.

FM WG

For the FM WG, while all the work is of value to the community, ontology/classification of mappings, mapping lifecycle framework, and meta-data classifications are most likely standardisation candidates. The work on use case descriptions is a useful (necessary), but supporting activity.

Once this work is sufficiently mature and stable, engagement with the standards process would seem well aligned. As the mappings work builds on existing ontologies and mappings, evidence-based and use case aligned contributions on guidelines and mappings seem easily possible. Indeed, this point is called out in the FM WG charter. Planned outcomes of the WG possibly relevant to standardisation include:

- Common machine-readable/actionable mapping representations
- Common guidelines of FAIR mappings
- Common classification of mappings

Fundamental Data Formats and Representations

The standardisation of data formats are common candidates for standardisation as they are unambiguous and well described. Based on existing literature [7], and the WECS and FM WG charters, standardisation of new fundamental representations of data is not sought and existing representations, such as JSON, YAML, are sufficient.

Extension to existing datasets, mappings, vocabularies, ontologies, and classifications (using fundamental data formats and representations) is expected.

Membership and Costs

Depending on the standards body and the group that is joined, it is mostly the case that membership is required. Membership enables the ability to engage in the standards process, including the submission and review of contributions, as well as voting rights on acceptance or ascent of new standards.

Membership is usually limited to entities (e.g. universities, companies, member states). Individual membership varies per SDO. Membership costs are often related to the entity that requests membership: less for universities and more for companies. Please note that membership does not automatically imply financial cost.

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[6] https://bioportal.bioontology.org/ontologies/WEAVE
[7] https://bioportal.bioontology.org/ontologies/WETAXTOPICS
[8] https://iea-wind.org/task42/

Time & Effort

The engagement required by the standards process is **significant**. This can be broken into a) the time required to work on the standard itself, including engagement with the relevant stakeholders, and b) the time taken from beginning a standardisation process to its completion. The former is dependent on the level of engagement sought, number of stakeholders involved, and the significance or relevance of the topic under discussion, the latter is often measured in years.

It is important to be aware of the required timescales when preparing and planning for standardisation. This is due to a combination of the pace at which the chosen standards community moves, the elaboration of the proposed standard itself, as well as the various stakeholder engagements that are required.

Community Building

As standardisation is a human-centric activity, it is essential to engage with existing communities to socialise the ideas/concepts/approach that should be standardised. It is unlikely that simply proposing new content to a standards group without any alignment to its existing topics or discussion with its existing members will be successful. TC members are very busy people and can find it challenging to give equal time and priority to all standards contributions.

As such, engagement with other standards members before any proposals or further elaboration of standards is strongly recommended. A good opportunity to do this is via attendance of in-person standards events. Equally, holding workshops and events with the relevant stakeholders – if appropriate - can also achieve the result. Furthermore, especially since the global pandemic, many groups now hold weekly online or e-meetings. This can also be a source of travel-free engagement.

Please note that, depending on the group, other stakeholders can be in different geographical regions, requiring accommodation of different time zones, cultures, and working practise.
Both the WESC and FM WG charters note community engagement, thus this type of activity will be familiar and ongoing to both. However, depending on the standards body, the level of accommodation and motivation of participants may be quite different from the current WG communities.

Pre-Standardisation

A less discussed element of the standardisation process is pre-standardisation. Pre-standardisation is an activity performed by various standardisation groups for works that are exploratory or immature in nature.

Outputs from pre-standardisation groups or activities will usually continue towards the formal standardisation process, making working with such groups a good first step to engage with a particular standards community.

Pre-standardisation groups are often friendly environments, allowing participants to learn the culture of the community, propose, discuss, and refine ideas, as well as find supporters for contributions.

Again, both WGs can be seen as already providing a form of pre-standardisation activity. However, pre-standardisation in the context of a standards body may likely have a less research focused community.

Relevant Standards Bodies for WGs

The following is a sampling of potentially relevant entities that may benefit one or both WGs in their standardisation goals.

As a general introduction, standards bodies are generally broken into three categories:

- International Standards Bodies (ISB): A standards producing body consisting of two or more countries.
- National Standards Bodies (NSB): A standards producing body of a single country.
- Domain or Industry-Specific Standards Bodies: A standards producing body consisting of various industrial or (often) non-governmental members.

ENTR Alliance

ENTR is a USA non-profit supporting the transition to renewal energy production by working with wind operators to address the data standardisation problem via open-source technology and architectures.

Relevance

ENTR is of high topic alignment to WESC WG. There currently is no direct relevance for FM WG.

Participation

Open to all.

Potentially Relevant Technical Committees

There are no documented sub-group, only a slack communications channel[9] and newsletter[10].

Advantages

- As a community-driven effort, it is likely to be a good location to identify community members and informal pre-standards development for WESC WG.
- As all work is open-source, there are no pay walls.
- ENTR seems focused on practical work, providing an evidence-based community effort.

Disadvantages

- ENTR does not produce standards.
- ENTR seems to be software-developer focused. While an essential element, this may ignore the wider socio-economic engagement required for standards development.
- From the available material, the stability and longevity of ENTR is not clear as the last documented funding was in 2021 and the last meeting of the group was in 2023.

International Energy Agency

The International Energy Agency[11] (IEA) is an international inter-governmental organisation that provides policy recommendations, analysis, and data on the state of the global energy sector. The IEA does not produce international standards; however, it serves as a platform to support international technical collaboration.

[9] https://join.slack.com/t/ieawinddigitalization/shared_invite/zt-1rqunqmww-48LOH8dCIkdpkDdZEiAJmA
[10] https://share.hsforms.com/1KkvJPJorSK2P2-3yY4m7Hw8mogq
[11] https://www.iea.org/

Of specific note is IEA Wind Technology Collaboration Programme (TCP)[12], which is an international co-operation of 24 countries and sponsor members that share information and research activities to advance wind energy deployment

Relevance

The IEA is of direct relevance to WECS WG as wind energy is part of its remit. WECS WG notes in its charter the intent to engage with IEA Wind Task 43[13]. Given the presence of ontologies in this group, it may also present relevant use cases or examples for FM WG.

Participation

Membership of IEA itself is limited to nation states:

- OECD Member States
- Accession Countries: Nation states in the process of joining IEA
- Association Countries: non-member states who collaborate with IEA

While membership of IEA Wind TCP[14] is also at nation state or sponsor level, participation is open to any organization located within a member or sponsor state.

Potentially Relevant Technical Committees

Within IEA Wind, groups are organised as 'tasks'. Potentially relevant active tasks include specific to digitalisation and ontology mapping:

- **Task 43** - Wind Energy Digitalization
- **Task 37** – Wind Energy Systems Engineering
- **Task 32** – Wind Lidar Systems
    - Completed, but produced an ontology[15]
- **Task 55** – Reference Wind Turbines and Plants
    - Has two work packages related to ontologies[16]

Advantages

- WECS WG has a pre-existing relationship with TASK 43.
- Clear topic alignment between WECS WG and the broader IEA Wind.
- Possible use cases for FM WG.
- Good environment for stakeholder engagement and community building.

Disadvantages

- IEA does not produce standards

CODATA

The Committee on Data of the International Science Council (CODATA)[17] is an international non-governmental organisation that exists to promote collaboration in the advancement of open science and improve the use and availability of data. It is a part of the International Science Council (ISC)[18].

[12] https://iea-wind.org/
[13] https://iea-wind.org/task43/
[14] https://iea-wind.org/about-iea-wind-tcp/members/
[15] https://github.com/IEA-Wind-Task-32/wind-lidar-ontology
[16] https://iea-wind.org/task55/
[17] https://codata.org/
[18] https://council.science/

CODATA does not produce formal international standards but does work towards information international data standards and community building.

Relevance

CODATA's aims of global collaboration related to data is highly relevant to both WGs. As CODATA is more targeted to data in the general case, this is more aligned to FM WG. Indeed, FM WG already intends to target CODATA as noted in their charter.

Participation

CODATA has three membership categories:

- National Members: Scientific academy, research council, scientific institution, or association of an institution that is related to research data.
- ISC Bodies: Scientific Unions or federation bodies of ISC
- Institutional Members: international organisations, academic institutions, governmental agencies, research institutions, or commercial organisations having an interest in scientific data

Potentially Relevant Technical Committees

Of CODATAs eight task groups[19] and single working group[20], relevant groups include:

- **Advancing Data Science for Sustainability TG**
- **Digital Representation of Units of Measurement TG**
- **Integrity WG**

Advantages

- CODATA has worked with the American National Institute of Standards and Technology to publish standards on fundamental physical constants, showing that there is a standardisation pathway via CODATA.
- As CODATA is open to all, it may be a low resistance path to developing outputs beyond the lifetime of the WGs.

Disadvantages

- CODATA is not a standards body, and so recommendations may receive limited impact across different global stakeholders.
- CODATA standards path via NIST may provide limited global impact as it is USA-centric.
- CODATA is strongly aligned to scientific research. From the perspective of international adoption beyond the scientific community, CODATA may not provide the impact from industrial or policy maker stakeholders desired by either WG.

International Organisation for Standards

The International Organisation for Standards (ISO) is an independent, international, non-governmental standards body with members from various NSBs. It promotes the development of standardization to aid the international exchange of goods and services. ISO's work results in international agreements, which are published as international standards.

ISO works on standardisation in various areas except those of electrical and electronic engineering as these are a related but distinct entity, see below.

[19] https://codata.org/initiatives/task-groups/
[20] https://codata.org/initiatives/working-groups/

Relevance

Given the large scope of the ISO and its goal of supporting international exchange of goods and services, the outputs of either WG would be a relevant activity at the ISO.

Participation

ISO has three categories of participation:

- Member Bodies: most prominent NSB representative of a country. These members have voting rights.
- Correspondent Members: Countries without NSBs. Such members are only observers to the standards process.
- Subscriber members: Countries with smaller economies who may observe standards development.

Potentially Relevant Technical Committees

Considering the 345[21] technical committees (TC) of the ISO, there are many potential points of engagement for either WG's outputs. It is worth mentioning that the breath potential use case domains for FM WG, in particular, means that there are many potential relevant TCs associated with use cases, to explore the existence of potential ontologies and associated mappings.

Notable TCs include:

- **JTC 1: Information Technology**[22] - Standardization in the field of information technology.
    - **ISO/IEC JTC 1/SC 34 -** Document description and processing languages
- **TC 10**: **Technical Product Documentation** - Standardization and coordination of technical product documentation (TPD), including technical drawings, model based (3D), computer based (2D) or manually produced for technical purposes throughout the product life cycle, to facilitate preparation, management, storage, retrieval, reproduction, exchange, and use.
- **TC 37**: **Language and terminology** - Standardization of descriptions, resources, technologies and services related to terminology, translation, interpreting and other language-based activities in the multilingual information society.
- **TC 46**: **Information and Documentation** - Standardization of practices relating to libraries, documentation and information centres, publishing, archives, records management, museum documentation, indexing and abstracting services, and information science.
- **ISO/TC 59 Buildings and civil engineering works:** Standardization in the field of buildings and civil engineering works
- **ISO/TC 146 Air quality:** Standardization of tools for air quality characterisation of emissions, workspace air, ambient air, indoor air, in particular measurement methods for air pollutants (particles, gases, odours, micro-organisms) and for meteorological parameters, measurement planning, procedures for Quality Assurance/Quality Control (QA/QC) and methods for the evaluation of results including the determination of uncertainty.
- **TC 154**: **Processes, data elements and documents in commerce, industry and administration** - International standardization and registration of business
- **ISO/TC 184 Automation systems and integration:** Standardization in the field of automation systems and their integration for design, sourcing, manufacturing, production and delivery, support, maintenance and disposal of products and their associated services. Areas of

[21] https://www.iso.org/technical-committees.html

[22] This is a joint technical committee between the ISO and IEC with various different sub groups related to data, documentation and IT.

standardization include information systems, automation and control systems and integration technologies.
- **ISO/TC 301 Energy management and energy savings:** Standardization in the field of energy management and energy savings
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Advantages

- ISO is a well-known and trusted name meaning that standards from the ISO would be considered trusted and high quality, increasing the likelihood for adoption.

Disadvantages

- It is important to note that ISO standards must be purchased for a fee in the general case. This may limit adoption of standards or their associated tools or data.
- ISO has received criticism[23] for the slow process of developing new standards. This may lead to lost momentum in the work of the WGs or any subsequent IG.
- Given the membership model of the ISO, it may require WG participants to first liaise with relevant NSBs before engaging.

International Electrotechnical Commission

The International Electrotechnical Commission (IEC) is the complement to the ISO, publishing international standards in the areas and related to electrical and electronic technologies.

Relevance

While the IEC has reduced scope compared to the ISO, the topic focus may be more relevant for the data and digitalisation focus of the WGs.

Participation

The IEC is made up of members, called national committees (NC), and each NC represents its nation's electrotechnical interests in the IEC. Individuals or companies can't become a member of the IEC[24]. They can only participate in the IEC via their NC. IEC members or some organisations with formal relationships with the IEC may send experts to participate.

Potentially Relevant Technical Committees

Considering the 224[25] technical committees (TC) of the IEC, there are many potential points of engagement for standardisation.

Notable TCs include:

- **TC 1: Terminology**
- **TC 3: Documentation, graphical symbols and representations of technical information**
  - **SC 3d: Classes, Properties and Identification of Products – common Data Dictionary**
- **TC 8: System Aspects of Electrical Energy Supply**
  - **SC 8A: Grid Integration of Renewable Energy Generation**
  - **SC 8B: Decentralised Electrical Energy Systems**
  - **SC 8C: Network Management in Interconnected Electric Power Systems**
- **TC 57: Power systems management and associated information exchange**
- **TC 88: Wind Energy Generation Systems**

[23] https://www.jtc1sc34.org/repository/0940.htm
[24] https://www.iec.ch/national-committees
[25] https://www.iec.ch/technical-committees-and-subcommittees

- **TA4: Digital System Interfaces and Protocols**

Advantages

- IEC is a well-known and trusted name meaning that standards from the IEC would be considered trusted and high quality.

Disadvantages

- It is important to note that IEC standards must be purchased for a fee in the general case. This may limit adoption of standardised ontologies or their associated tools or data.
- IEC is heavily industry dominated (~90%[26]). This may act as a barrier to adoption of proposals without industry support.
- Given the membership model, WGs or IGs may have to first liaise with NCs.

Industrial Ontology Foundry (IOF)

The Industrial Ontology Foundry (IOF) was formed to address the consistency and inter-operability between different viewpoints and principles that underpin the design of manufacturing related ontologies[27].

Since 2019, IOF is part of the Open Application Group (OAGi). OAGi is a non-profit standards organisation focusing on standards to address inter-operability challenges.

Relevance

Given the goal of creating ontologies for the manufacturing and engineering industry, there is potential alignment between IOF and both WGs, with emphasis on FM WG.

Participation

From 1st October 2023, IOF participation will require paid membership, however, precise costs are not yet clear[28]. Until then, membership is free but required[29].

Potentially Relevant Technical Committee

At present, there are 8 WGs listed on the public website, of which "IOF Core" would seem most relevant to FM WG.

Advantages

- Active community with events and resources and relevant stakeholders from different sectors[30].
- Part of a standards producing entity.
- Has already produced the IOF Core Ontology.

Disadvantages

- Relatively young organisation (created in 2016), so possibly limited impact, however, there seems to be momentum based on the activity of the group.

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[26] https://www.iec.ch/national-committees#nclist
[27] https://www.nist.gov/publications/industrial-ontologies-foundry-iof-core-ontology [cite]
[28] https://www.linkedin.com/feed/update/urn:li:activity:7089773905090908160/
[29] https://industrialontologies.org/participation-request/
[30] https://app.smartsheet.com/b/publish?EQBCT=51ec8cc5ed394264b1d4440ab76c47fa

European Committee for Standardization (CEN)

Founded in 1961, the European Committee for Standardization (CEN) is a private non-profit standards organisation tasked with fostering the EU economy.

Relevance

As a European-focused organisation with an established history and topic coverage, this group would seem very relevant to both WGs.

Participation

Participation at CEN is via one of the following memberships:

- National member counties and affiliates NSBs.
- Affiliates countries being considered for EU membership.
- Companion standardisation bodies.
- European partners.

Potentially Relevant Technical Committee

Considering the 386[31] technical committees (TC) of CEN, there are many potential points of engagement for either WG.

Notable TCs include:

- **CEN/CLC/JTC 2**: Power Engineering
- **CEN/CLC/JTC 14:** Energy management and energy efficiency in the framework of energy transition
- **CEN/CLC/JTC 25:** Data management, Dataspaces, Cloud and Edge
- **CEN/TC 304**: Information and communications technologies - European localization requirements
- **CEN/TC 310**: Advanced automation technologies and their applications
- **CEN/TC 468**: Preservation of digital information
- **CEN/WS MODA**: Materials modelling terminology, classification and metadata
- **CEN/WS OYS**: OYSTER on Materials characterisation - Terminology, classification and metadata
- **CEN/TC 445**: Digital information Interchange in the Insurance Industry

Advantages

- Large, well-known, and influential standards producing body with over 200,000 contributors across all sectors.
- Many active topics and groups that can be engaged with.
- Strong integration and cooperation with ISO.

Disadvantages

- European focus may not be attractive for global impact
- As a large body with established areas, may be challenging to build consensus on new, potentially disruptive, contributions.

[31] https://standards.cencenelec.eu/dyn/www/f?p=CEN:6

ECLASS

The ECLASS e.V. association is an industry consortium for the classification of products and services. Is it manifest in ECLASS, a classification system based on hierarchical grouping of products and services.

Relevance

There may be potential to explore synergies between the classification of products and services in the annually released ECLASS dictionary and an ontology mapping approach of FM WG.

Participation

Membership is fee paying, but the fee information is not publicly available. Member positions[32] are as follows:

- Steering Committee Members: full voting rights
- Ordinary Members: limited voting rights
- Supporting Members: no voting rights

Engagement is possible on a free basis via the ContentDevelopmentPlaform, however, it does not seem that this comes with a voting position.

Potentially Relevant Technical Committee

As ECLASS focuses on a single standard, there is no publicly visible breakdown of different TCs or working groups.

Advantages

- As ECLASS itself is based on standards (DIN 4002, IEC 61360 and ISO 13584), engagement may help show the pathway towards ontology mapping standards.
- Annual release of ECLASS shows that the community is active and engaged.

Disadvantages

- A fee is required to access a licence to use ECLASS, although free access is available for educational institutes.
- The organisation was founded in 2000 and may not have a sufficient presence in the standards community yet for the needs of FM WG.

Specific Challenges for RDA WGs

The following lists potential challenges in the WECS and FM WG standardisation goals.

Standardisation Goals

WECS WG

WECS WGs charter sets out clear goals within a clear domain of interest. As the WG is in its initial phases, it is recommended to build upon its current goals to identify *standardisation* goals. Outputs related to controlled vocabularies would seem a likely choice. Given the surrounding non-technical effort in pursuing standardisation, having a well-articulated standardisation goal is recommended.

[32] https://eclass.eu/fileadmin/Redaktion/pdf-Dateien/Sonstige_Dateien/ECL-benefits_for_members-en.pdf

FM WG

A challenge for FM WG is the lack of clear application domain. The WGs charter makes it clear that general domain inter-operability via mappings, categorisations, and mapping representations is sought, with several relevant groups and task forces listed. However, standards are usually focused on specific use cases in specific domains. It is recommended to identify some priority areas to map between, coupled with relevant TCs, and formulate a standardisation strategy. Given the significant amount of time and effort required for standards, this is an important first step.

Timing

When engaging in standards it is necessary to answer the question of "why now". In this case, why is now the right time to perform standardisation of, for example, this particular FAIR guideline, controlled vocabulary, mapping representation, or classification.

When answering this question, it is necessary to show as much evidence as possible. Common motivations for response include:

- Maturity of technologies involved.
- Meaningful support from different sectors (industrial, academic, policy, standards bodies themselves)
- Clear need or lack of suitability of existing approaches.

Future or imminent need is a possible argument, however, this often cannot be justified through citations or literature, as would be found in academic documentation, and requires contributions from the existing standardisation community.

From review of the WGs charters, while there is strong engagement with different industrial and non-industrial groups, a notable number of these entities are research orientated. It may be necessary to wait until the topics have reached maturity before engaging in standardisation to avoid "generic" contributions. As many standardisation communities see significant industry participation, research-based contributions without demonstrated/deployed exemplars, may not be readily considered. Engagement with pre-standardisation groups may be a possible pathway, however, this also requires a degree of maturity, albeit lesser.

Stagnation or Maintenance

As ontologies, controlled vocabularies, guidelines, or mappings in different domains continue to develop over time, a possible risk is the need to update them. Given the significant timelines involved in the standards process, this can become a blocker to adoption, in particular from industry partners. This is embodied in the question of "why should we support of adopt this standard if it will become out of date relatively quickly". For example, recent work from the European Union Observatory for ICT Standardisation (EUOS)[33] notes the need for "sustainability through continuous maintenance".

It is recommended for both WGs to consider appropriate responses to this question based on technical expert domain knowledge. For responses that involve human effort, it is important to consider where such effort will come from.

[33] https://zenodo.org/record/7907025#.ZHbTi3ZBy39

Comprehension

Given the strong theoretical basis, of ontologies, especially in the more abstract upper-level ontologies, a risk is a lack of understanding of the ontologies, how they map to use cases, and their role in complementing or even replacing existing standards approaches.

Although the FM WG has good engagement from industry, as the work moves towards the more formal standardisation process, there exists a challenge of getting acceptance of this new approach from the standards community. Possible questions or concerns may include:

- Who will do this work?
- The proposed ontology (especially the high-level one) is too abstract and doesn't help.
- How does this Ontology integrate with existing approaches?
- Why do we need this, as we already have a solution?

In this regard, two proposed actions are suggested:
First, engagement with pre-standardisation is recommended to help build "buy in" from the relevant communities. This will help to advocate the use of ontologies slowly, generating understanding.

Second, PoC, demonstrators, or mappings to relevant use cases. This activity is already underway within both WGs. It is suggested that once the relevant standards community to work with is identified, existing use cases be taken and mappings of how different levels of high, mid, and low level ontologies are made. This will aid in understanding and also encourage engagement from other stakeholders to contribute to both development of the standards, as well as adoption in industry and policy.

In the context of WECS WG, as the domain is more scoped, such comprehension challenges are less likely.

Harmonising

It is essential to consider existing works of other groups before proposing or engaging. To do so runs the risk of encroaching on the (perceived or actual) territory of other WGs/TCs. Not only does this lead to duplication of effort but can also create active resistance when seeking support for any proposed standard. Currently, certain national governments are increasingly engaging with the standard process with one of their goals being to reduce overlap or replication of standardisation activities across the standards developing organisations (SDO)s.

Considering the FAIR guidelines, both WGs have called out relevant entities/groups/consortia to engage with.

From a standards perspective, landscape and potential gap analysis can help, as well as engagement and discussion with the community.

Scope

It can be said that much of the work in standards is use case-driven, meaning that standards are closely related to a specific process, product, or service and often in a well-known context. Accordingly, WESC WG's expected outputs can be more intuitively mapped to TCs or WGs in the various standards bodies aligned to the wind energy domain. However, this presents a possible challenge for FM WG as their fundamentally abstract nature creates a disconnect from much of the existing standards efforts across the SDOs.

For FM WG, two possible outcomes may form: a) focus on the standardisation of outputs focusing on concrete examples or b) accept that the more generic outputs will be standardised in a WG/TC that does not show a natural fit. An important consideration for b) is that it may create friction between groups.

Again, building on the existing efforts in community engagement, awareness of the relevant landscape, industrial support, and exemplar use cases will help on these points.

RDA Interest Group

In pursuit of standardisation for one or more outputs of the WGs, an RDA interest group (IG) could serve a coordination mechanism to support the standardisation effort in a particular venue, such as those identified above. It is recommended that a clear standardisation goal is established to be the focus of such an IG.

Given the time required for the standardisation process, the IG could serve the role of maintain a WG's community beyond its lifetime to provide a platform for crafting, updating, refining, or editing a standards contribution out with the standards body. It would also enable collective response to contributions towards standards received from others, especially when such contributions are not well aligned to contributions from the WG or IG.

This may be challenging as the stated purpose of an IG[34] is not to promote specific projects or technologies. For example, a standard on a single ontology mapping representation from FM WG.

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