Co-funded by
the Health Programme
of the European Union

JASEHN
Joint Action to Support the eHealth Network

Preliminary Report

on

European semantic interoperability in eHealth

Document Information:

Document status:	For information to the members of the eHealth Network at their 11th meeting on 09 May 2017
Approved by JAseHN sPSC	Yes
Document Version:	2.0
Document Number:	D5.5
Document produced by:	Joint Action to support the eHealth Network • WP5 Interoperability and Standardization • Task 5.5 Semantic Interoperability
Author(s):	Luc Nicolas (External) Michiel Sprenger and Merik Seven (Nictiz)
Member State Contributor(s):	UK (Jeremy Thorp, HSCIC), Finland (Juha Mykkänen, THL), Austria (Stefan Sabutsch, ATNA)

TABLE OF CHANGE HISTORY

VERSION	DATE	SUBJECT	MODIFIED BY
V0.1	24/02/2017	First proposal of document scope, content and timing	Luc Nicolas (External)
V0.11	27/02/2017	Alignment of part 4. Adding of methodology.	Luc Nicolas (External)
V0.12	28/02/2017	Comments, additions, etc	Michiel Sprenger / Merik Seven
V.0.13	21/03/2017	Minor changes following sPSC review	Luc Nicolas (External)
V1.0	29/03/2017	Fixed as preliminary 1.0, sent to sPSC	Michiel Sprenger, Nictiz
V1.1	21/04/2017	Referred Projects dates added. Timing adapted.	Luc Nicolas (External)
V1.2	21/04/2017	Checked and approved	Michiel Sprenger, WPL
V2.0	24/04/2017	For submission to eHealth Network	

LIST OF FIGURES

TABLE OF CONTENTS

1. Scope of task 5.5 as described in the JAseHN DoW

Here we quote the JAseHN DoW, from 2015:

> *"This task will analyse the proposals elaborated by dedicated EU funded projects such as Semantic Healthnet whose objective is to provide a semantic referral point for all key stakeholders in Europe. It will also organize –* ***in close cooperation with WP7 (Exchange of knowledge)*** *– a review of existing MS strategies in relationship to semantic interoperability. It will furthermore analyse choices proposed by more specific projects due to start in 2015 (ASSESS-CT, OpenMedicine, eStandards etc.) on previous related work within epSOS and currently within EXPAND.*
>
> *It will make sure that use cases and supporting EU guidelines can be updated accordingly. The overall objective of this task is thus to provide the eHN* ***with a consolidated analysis of proposals made by national and EU projects which can provide significant inputs in this domain****. It will also make sure that objectives are aligned with task 5.3, 5.4 and 5.6.*
>
> *A report will be produced at the end of the JA but intermediary papers will be produced, pending the availability of sufficiently documented material originating from relevant projects."*

2. Main scope of the final Report :

The report will not aim at providing a full coverage of all aspects (technical, organisational, legal etc.) associated with semantic interoperability but rather to focus on the policy level and provide commented analysis of the key recommendations issued by major initiatives and projects at EU at National levels.

In the European cross-border perspective semantic strategy is of course an important element, but links with national semantic strategies and assets are of course also fundamental. The report will thus analyse how a European collaboration can also benefit from and give support to national strategies.

In order to comply with the ReIF (Refined eHealth Interoperability Framework) 5 reference layers, the word "semantics" should be replaced by "information".

3. Internal Dependencies:

Contact has been established with the Organisational Work Group of the **eHMSEG - Semantic Task Force** in order to make sure that the key outputs of the task force which is supporting the CEF DSI deployment are duly taken on board. Members of this task force have recently expressed the need to support a longer term vision which goes beyond the mere incremental adaptation of the epSOS/EXPAND legacy. A **Semantic Boot Camp** is organized in March 2017 with as a key objective to allow Member States to show what they are ready to share and also learn from each other best practices, experiences, and mistakes. Information provided at this occasion will also be fed into this report.

Links with JAseHN WP7 need to be established in order to avoid the multiplication of questionnaires sent to MS with possible overlaps, which could create a real survey fatigue with Member States representatives.

4. Proposed content of the report

4.1 Short Description of expected benefits (and drivers) of semantic interoperability

The report will briefly document the expected value of semantic strategy which is best captured through the concept "capture once, use many times". The rapid multiplication of health related data providers and the acceleration of the development of the "big data" concept will be put in perspective while the most favourable conditions (drivers) for its implementation will be described.

4.2 Review of recommendations of past and ongoing initiatives and projects

4.2.1 Semantic Health (2008)

The purpose of this EU funded project is to describe a short and medium term Research and Deployment Roadmap for Semantic Interoperability in eHealth. It started by defining 2 levels on short and mid/long term (operational deployment and research) and 3 dimensions (Electronic Health Records, ontologies & terminologies and terminologies for public health) for Semantic Interoperability. The vision is to reconcile the needs for the direct patient care safety, biomedical and clinical research and for public health by the reuse of direct care data: from gene to individuals and populations. Milestones for the short the mid/long term were set.

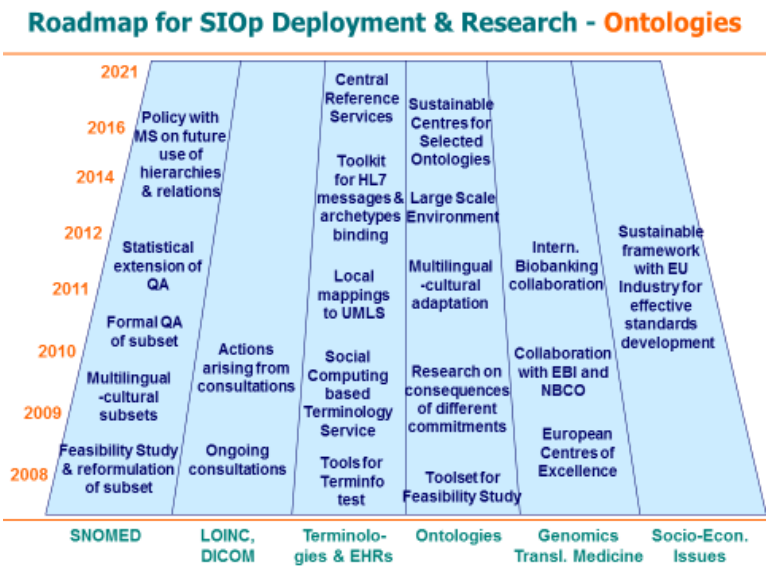

Figure 1 : Semantic Health – Ontologies for research RM

Aside from the creation of a network of excellence, some of the key short term recommendations of this initial roadmap included to agree to use archetypes (ISO 13606) for representing and sharing clinical data structures over the EU and work parallel on ontology bindings to archetypes, to use a validated subset of SNOMED-CT to experiment alternative representation for a specific use case and to test bindings between terminologies and information models and to create a framework for aggregation of EHR data for public health use. A specific emphasis was put on the critical need of development of open source tools (archetype editors, aggregation logic tools…).

4.2.2 CALLIOPE Roadmap (2010)

"It is recommended that the EU eHealth High Level Group, together with European Commission:

- Consider the area of semantic interoperability as an area largely catering to multinational collaboration and empower a collaborative governance framework that will facilitate collaboration of the various stakeholders, incl. international SDOs and relevant industry bodies at all three layers: steering, strategic and empirical.
- Provide direction, prioritize use cases based on high priority diseases common to all MS.
- Support co-ordination of work of national and European professional associations to engage into the development of terminology and translation services developed together with data structures and linked to the development of respective care pathways.
- Encourage the definition of appropriate quality standards for data in medical records and other electronic medical data/documents which are to be shared across borders.
- Address the challenges of multilingual semantic mapping.

4.2.3 Use of SNOMED-CT Information Paper (2013)

MAKING USE OF SNOMED CT: KEY QUESTIONS and STATUS as of SEPTEMBER 2013

This information paper submitted to the eHN explains the rationale behind the choice made by a number of EU countries to join IHTSDO and use SNOMED-CT as their main reference core terminology. It however also somewhat considers the larger semantic interoperability ecosystem and provided a first proposal of data collection to improve sharing of knowledge, tools and best practices between MS.

4.2.4 Assess-CT (January 2015-June 2016)

The 5 final main recommendations of the project are available since December 2016 (See http://assess-ct.eu/fileadmin/assess_ct/final_brochure/assessct_final_brochure.pdf). The report considers SNOMED CT as currently the best available core reference terminology for cross-border, national and regional eHealth deployments in Europe but states that it should be part of a wider global terminologies eco-system and proposes a use case based gradual implementation.

4.2.5 OpenMedicine (January 2015-December 2016)

The deliverables of the project will be public from April 2017 on. The project proposes 12 recommendations which should lead in the medium/long term to the univocal identification of medicinal products in cross border ePrescriptions, eDispensing reports and ePatient Summaries in Europe and beyond based on the ISO IDMP implementation. In the short term, unique Pharmaceutical Product ID should be created within the Union and built by using the Article 57 (2) substance standard data base as currently made available through the **SPOR** project. Effective piloting is described as possible from mid-2017 on.

4.2.6 eStandards (May 2016- April 2017)

The final deliverables of E-standards are not yet available but a first iteration of the Roadmap proposed is public. It proposes a number of short, medium and long term actions associated with content, models, interfaces, services and policy dimensions. (See in particular section 7.11 of http://www.estandards-project.eu/eSTANDARDS/assets/File/eStandards_D3_3_Initial_Draft_Roadmap_for_Essential_Standards_Developmen.pdf) The latter will be more specifically analysed here in details.

4.2.7 Semantic healthnet (December 2011- May 2015)

The project objective was ambitious as it planned to "develop a scalable and sustainable pan-European organisational and governance process for the semantic interoperability of clinical and biomedical knowledge, to help ensure that EHR systems are optimised for patient care, public health and clinical research across healthcare systems and institutions". It used cardiovascular medicine as an "exemplifier". In the SemanticHealthNet Description of Work it was foreseen that the project would end by establishing a virtual organisation to connect the stakeholders who had contributed to the development of semantic interoperability assets during the project. This virtual organisation would sustain the Network of Excellence and promote the ongoing development of further semantic interoperability assets.

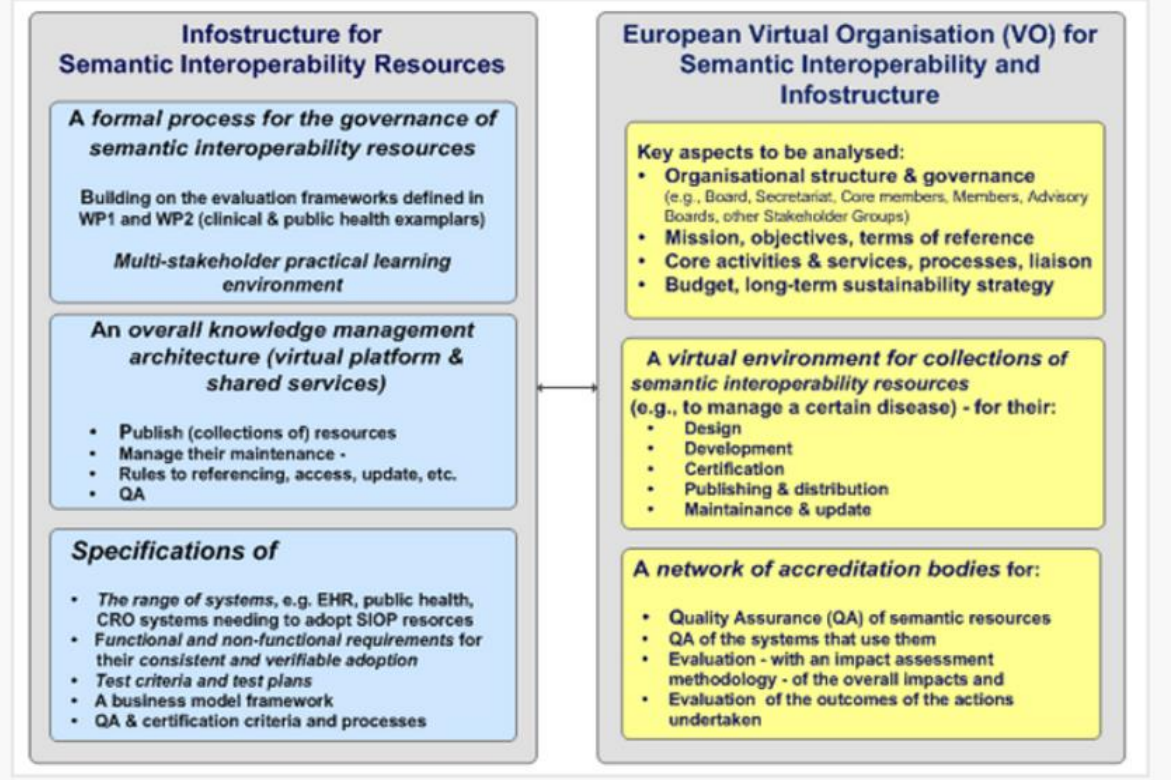

Figure 2 : Semantic Health Sent initial scope

The project has instead proposed an Institute: the European Institute for Innovation through Health Data (i~HD). Its ambition is to become the European organization of reference for guiding and catalysing the best, most efficient and trustworthy uses of health data and interoperability, for optimizing health and knowledge discovery.

The project has elaborated 12 recommendations which aim at describing what should be the role of Health Ministries. It states in particular that MS should define the use cases but avoid developing standards. Governments should purchase rights for royalty-free use of standards developed by SDOs while the standards need to be agreed upon at European level. According to the project, semantic interoperability needs to be widely understood as a business model for investment in building and maintaining the necessary infrastructure, info-structure and services[1].

4.2.8 The Antilope project (February 2013- January 2015)

The project had as main focus interoperability. It does not specifically tackle the semantic interoperability issue but it proposes a set of 8 use cases whose implementation is described by the corresponding realization scenarios which are linked to a selection of (IHE and PCHA) profiles. Each profile is an implementation guidance specification for the underlying standards for a concrete and interoperable implementation.

[1] According to the ReIF: Infrastructure refers to the generic communication and network protocols and standards, the storage, backup, and the database engines. Infostructure (named here "information") refers to the functional description of the data eHealth Network 10 model, the data elements (concepts and possible values) and the linking of these data elements to terminologies that define the interoperability of the data elements.

Figure 3 : Antilope standards building blocks

4.2.9 Other implementation projects:

The EU has funded a number of research projects which have put to the test the semantic interoperability challenge. Although limited in scope and not operational, they have delivered a number of lessons and recommendations which are worth analysing, focusing mainly on those which have an impact on policy level.

Among the projects worth mentioning and without any claim for completeness one can cite: DebugIt (2008-2011), (Ponte (2010-2013), EHR4CR (2011-2016), EURECA (2012-2015), SALUS (2012-2015), OpenPhacts, Linked2Safety (2011-2014), eTRIKS (2012-2017), p-medicine (2011-2015), Transform (2010-2015), Emif (2013-2017)and BioMedBridges (2012-2015).

Convergence meetings have been organized between those projects in January and March 2013. Other major European Joint Actions and projects such as PARENT, SUSTAINS, PALANTE and RENEWING HEALTH have also been somewhat associated with this process.

4.2.10 Semantic Interoperability Community (SEMIC)

Semantic Interoperability is by essence an open global multi-sectoral issue. The report will thus also briefly introduce the work performed by the Semantic Interoperability Community (SEMIC) which is a European Commission initiative aiming to improve the semantic interoperability of interconnected e-Government systems. It is funded under the Action on Promoting semantic interoperability amongst the European Union Member States of the Interoperability Solutions for European Public Administrations (ISA^2) Programme.

4.3 Update on national strategies related to semantic interoperability:

Aside from the information collected through the channels listed above, a new questionnaire will be prepared in order to capture the evolving situation in Member States. The questionnaire will be prepared in close cooperation with the Member States which have committed resources for task 5.5, namely, France, Norway, Italy, Hungary-P (GYEMSZI), the Netherlands, Sweden, Greece, Romania, Finland (THL) and Croatia.

One of the objectives is here also to identify specific national initiatives which have been undertaken to fulfil the "one (input) to many (purposes)" goals and thereby reduce the gap between the clinical and the policy support/epidemiological/research worlds and which try to provide short or mid term pragmatic solutions.

One of those already identified national project which will receive a specific attention in this report is the **Clinical Building Blocks** (CBBs) project implemented today in the Netherlands and Belgium. CBBs (also called Clinical Models, or Health and Care information Models, HCIMs) are "detailed data specifications of elementary medical concepts. The aim of the clinical building blocks is to specify precisely which terminology can be used without thereby implicitly choosing a given technical standard, reference model, or platform. This is because every care establishment does the latter for themselves. In this sense, therefore, the building blocks are 'agnostic' or 'neutral' ". In yet other words: the CBBs are building blocks for the specification of data sets for given use cases, which in turn can be implemented into software solutions.

Furthermore the strategy pursued by Finland will be analysed in detail.

4.4 Key recommendations to the eHealth Network

Based on the analysis performed and with the active support of participating countries, the report will propose a number of recommendations associated with short, medium and long term actions to the eHealth Network.

5. Proposed methodology:

10 countries have offered resources to contribute to this specific task, with some differences however in the proposed level of involvement. In order to have a clear understanding of the possible role of each participating country, a mail will be addressed to participants requesting to confirm their level of investment in order to be able to differentiate between active and passive contributors. Mailing lists will be created accordingly.

The initial expectations for active members are the following ones:

- Reading of (selected) key deliverables of above mentioned projects and providing comments and feed-back which will support a collaborative drafting process.
- Identification and review of national projects or initiatives not directly mentioned in this paper
- Elaboration of the questionnaire to be sent to MS and participation in the analysis of the results.
- Proposal of global recommendations for the eHealth Network.

The passive members are expected to critically review draft deliverables of task 5.5

The work will be divided between participants according to their confirmed level of investment. An assessment methodology will be proposed in order to collect inputs in a structured manner.

In a first phase (May 2017), the task will analyse the recommendations of the already terminated projects.

The questionnaire directed to MS will be prepared in May/June 2017 with answers expected by end of August and analysis performed in August/September 2017.

The remaining projects recommendations will be analysed in September 2017.

6. Risks

All the materials necessary to perform the analysis proposed under chapter 4 are not yet available. The report will also rely on timeliness of answers provided by Member States.

While taking those risks into account the final report will be submitted for discussion to the eHealth Network in November 2017.