Besoins ontologiques pour la transformation des aliments

Food process ontology requirements

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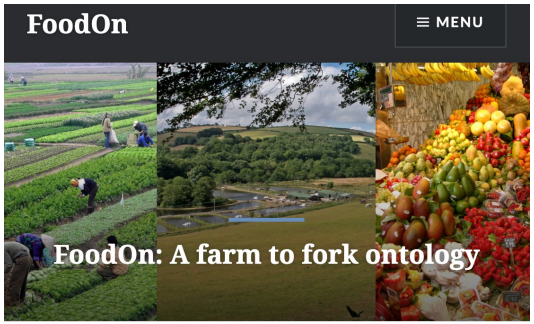
Contexte

Objectif
modéliser les processus pour la transformation des aliments



https://foodon.org/

- Projet démarré en 2018
- Basé sur LanguaL: description des **aliments**
  - 14 facettes
  - 1975
  - Utilisé dans des BD de composition d'aliments:
    - 27 000 aliments européens
    - 40 000 aliments

www.langual.org

Contexte

Membres

- **William Hsiao** and
- **Damion Dooley** Simon Fraser University Centre for Infectious Disease Genomics and One Healts
- **Matthew Lange** (IC-Foods)

Curateurs

- Damion Dooley
- Magalie Weber
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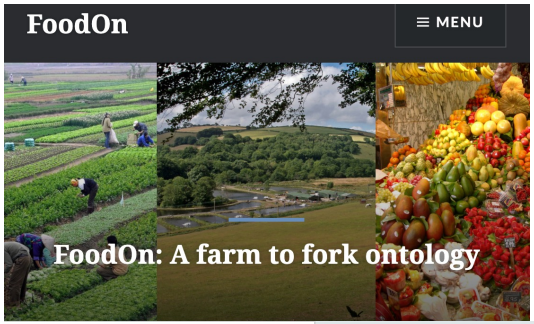
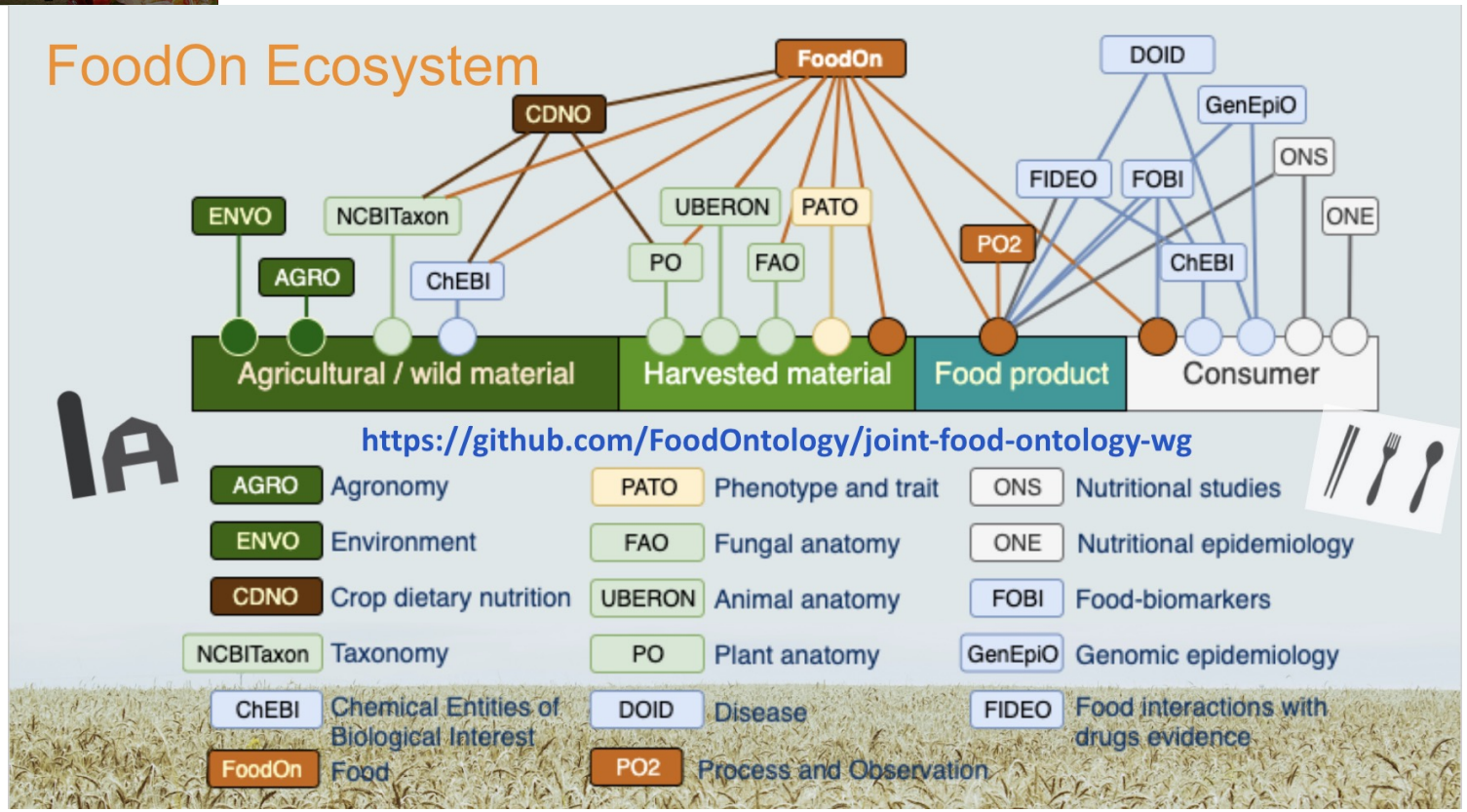
Contexte





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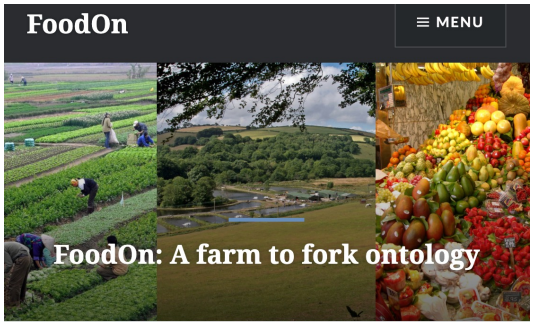

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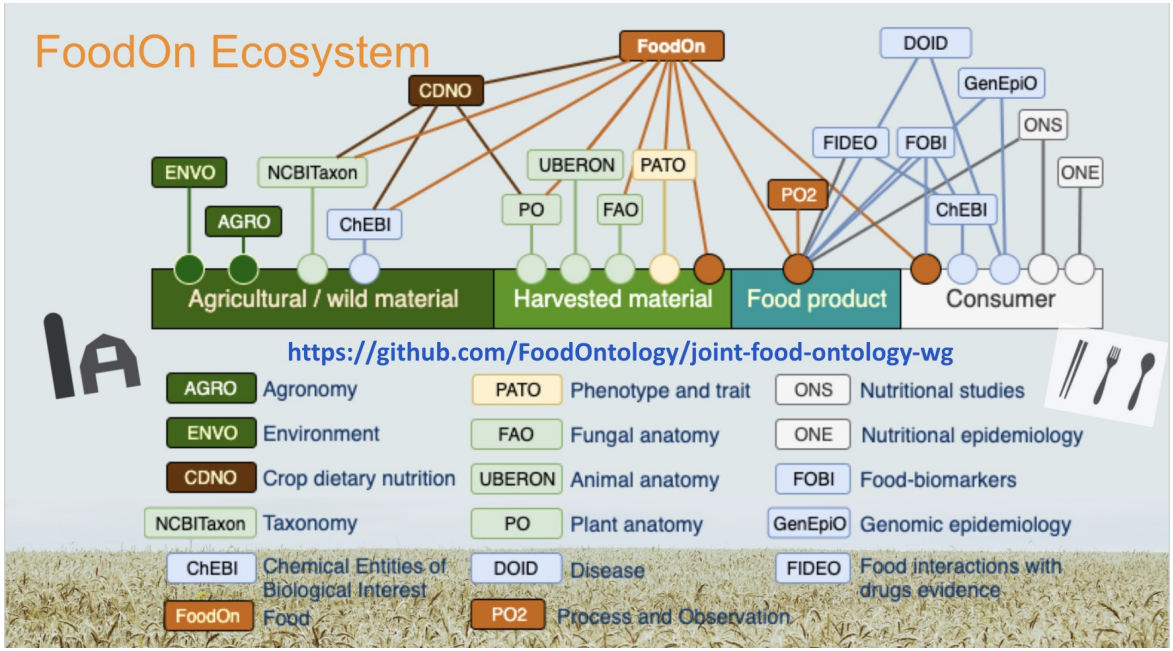
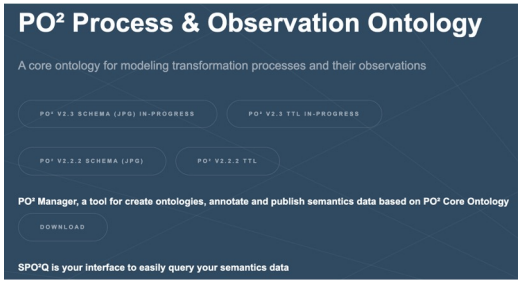
Contexte

- OBO Foundry
  - Principes
  - RO
- Utilise des termes
  - ENVO
  - AGRO
  - UBERON
  - PO





Ontologie PO2 [MTSR 2016,ESWA 2022]

Un **modèle** pour représenter

- des processus de transformation
- des entrées et sorties
- des observations
- des matériels et des méthodes

7 classes à spécialiser:

- PO2:Process
- PO2:Step
- PO2:Component
- PO2:Attribute
- PO2:Material
- PO2:Method
- PO2:Scale

Un **core model** en OWL qui utilise des ontologies standards

- SOSA/SSN
- Time Ontology
- BFO

Spécialisé en **domaines d'application**:

- fabrication des gels laitiers [INDA 2019]
- fabrication de saucisses [IFOW 2020]
- fabrication poudres végétales [DIB 2020]
- matériaux biocomposite [MTSR 2021, ESWA 2022]
- microfiltration du lait [IJAEIS 2022]

Dervaux, Stephane; Dibie, Juliette; Ibanescu, Liiliana; Raad, Joe, 2021, "PO² Process and Observation Ontology", https://doi.org/10.15454/XSVVBW, Recherche Data Gouv, V4

Analyse des besoins

Objectif: modéliser les processus pour la transformation des aliments

Comment

- un groupe de travail
- comparaison des modèles
    - OBO
    - PROV-O
    - OWL Time
    - SOSA/SSN
    - PO2

Entity Type	OWL-Time	PROV-O	SOSA / SSN	PO2	OBO
Object Property					
hasTime					*Missing*. IAO:has time stamp is limited to instants for domain, and time measurement datums for range.
hasBeginning					*Missing*
hasEnd					*Missing*
hasTemporalDuration					*Missing*. IAO:is duration of is similar but requires a time measurement datum to express duration

OBO process model parts + OWL-Time

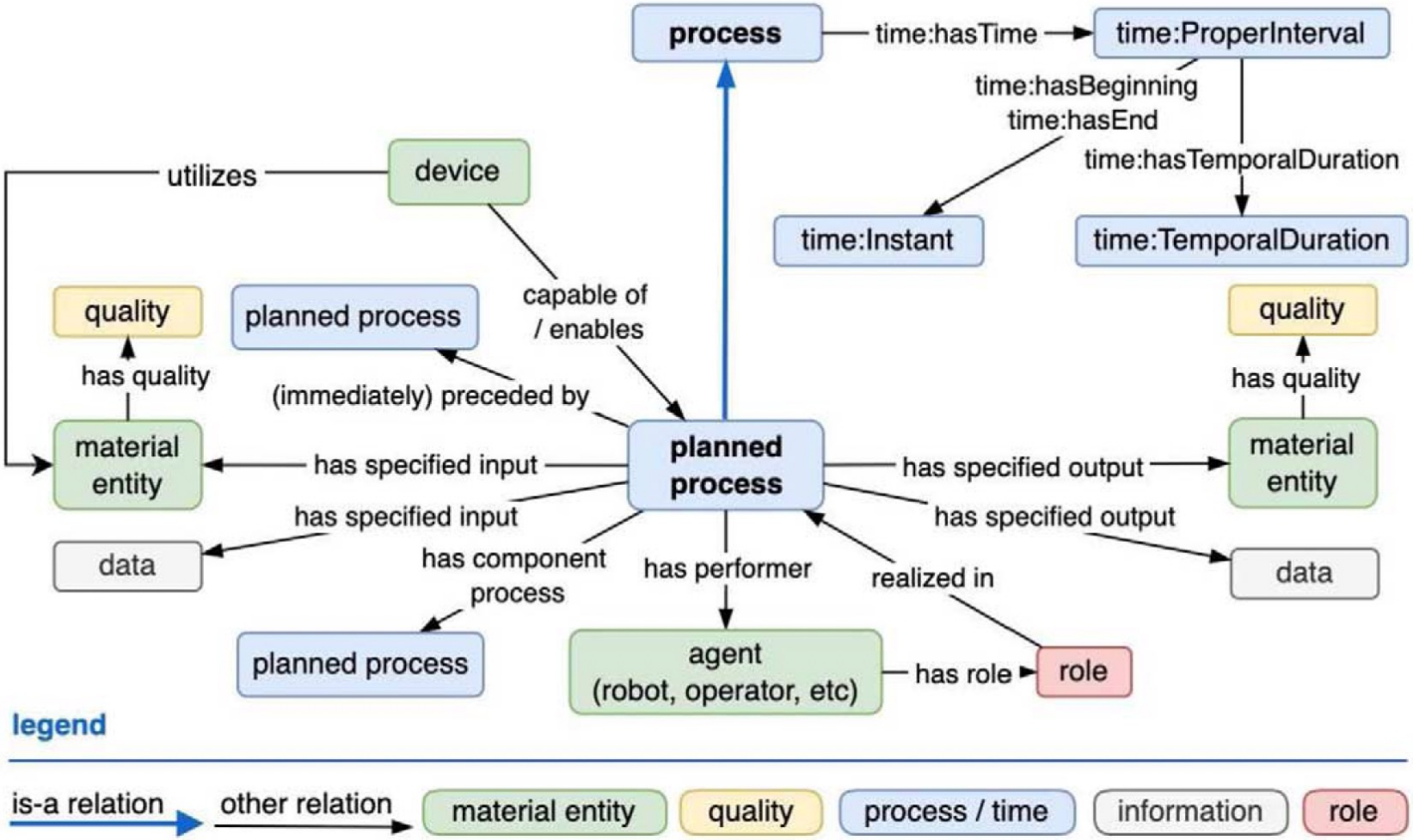


Table 1

A gap analysis of selected OWL ontology process related terms

Entity Type	OWL-Time	PROV-O	SOSA / SSN	PO2	OBO
Class					
occurrent	Instant	InstantaneousEvent			BFO:zero dimensional temporal region
occurrent	ProperInterval				BFO 2020:temporal interval
occurrent	TemporalDuration				BFO:one dimensional temporal region
process		prov:activity		PO2:Transformation process	OBI:planned process
process				PO2:Step	*Missing*
process			sosa:Actuation	sosa:Actuation	*Missing*
process			sosa:Sampling		OBI:material sampling process
process			sosa:Observation	sosa:Observation	OBI:assay
characteristic			ssn:Property	ssn:Property	PATO:quality
characteristic					PATO:energy
material entity			sosa:Sensor	sosa:Sensor	*Missing*
material entity			sosa:Actuator	sosa:Actuator	*Missing*
material entity			sosa:Sampler		*Missing*
material entity				PO2:Component	FOODON:food material
material entity			sosa:FeatureOfInterest	sosa:FeatureOfInterest	BFO:material entity
data structure			sosa:Procedure	sosa:Procedure	IAO:plan specification / OBI:protocol
data structure			sosa:Result	sosa:Result	IAO:measurement datum
data structure				PO2:scale	

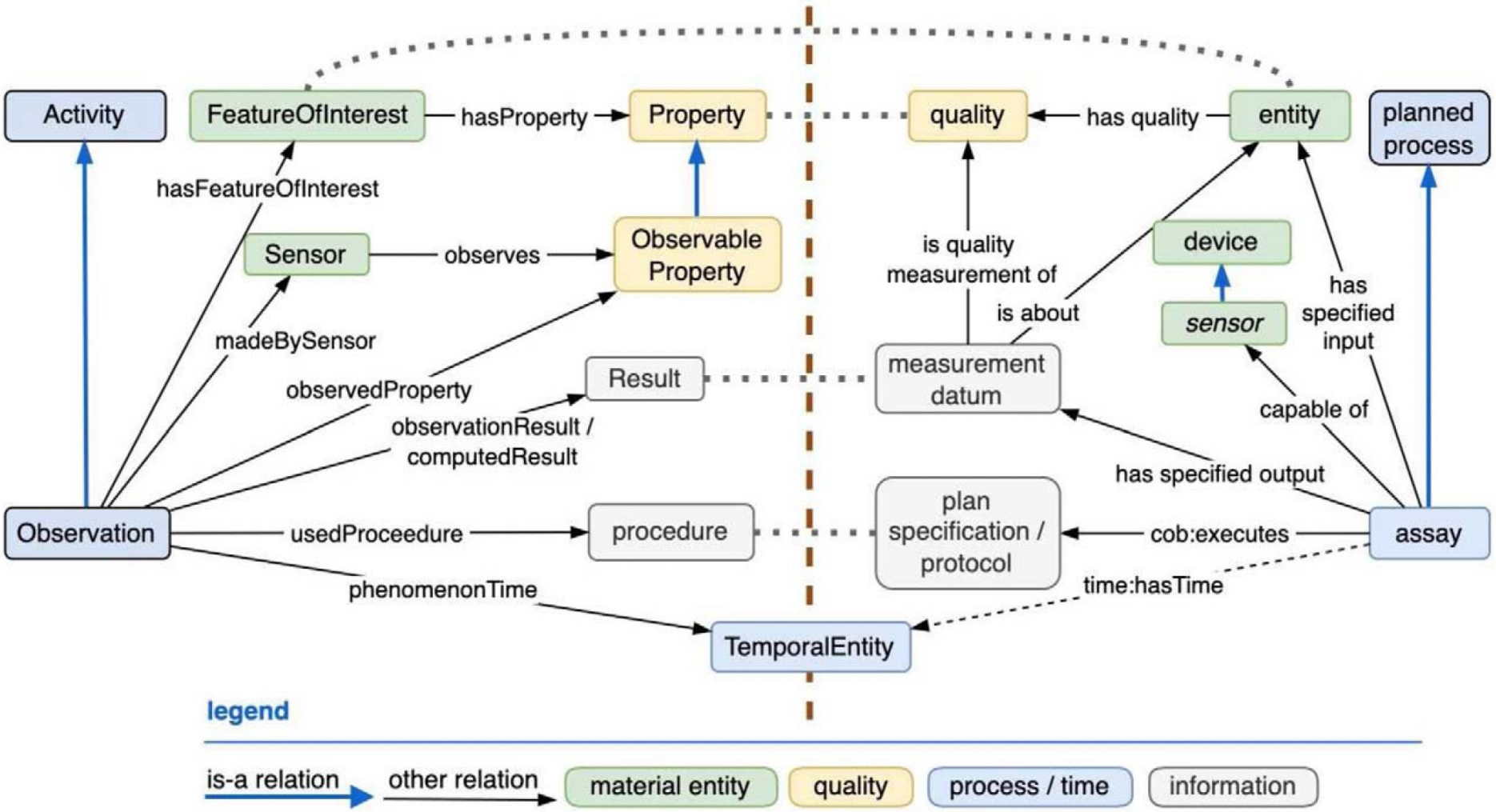
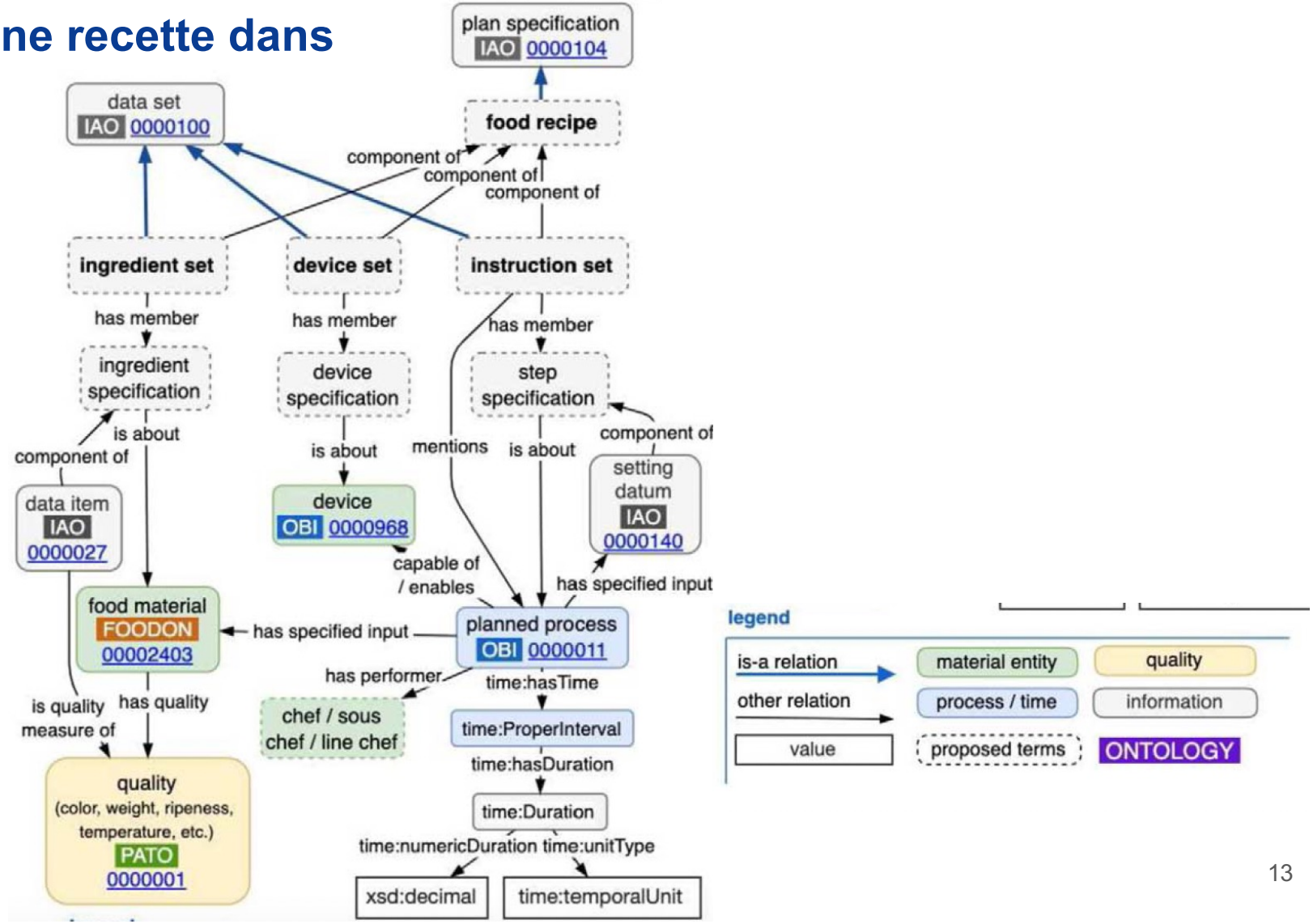


Fig. 18. Comparison of SOSA observation and OBO time-enhanced process.

Entity Type	OWL-Time	PROV-O	SOSA / SSN	PO2	OBO
		E2 wasDerivedFrom E1		E1 isComposedOf E2	E2 derives from E1
		P used E		P1 has input E1	P has input E; P has specified input EP has primary input E
					P1 directly provides input for P2
		E wasAttributedTo A			E produced by A
		E wasGeneratedBy P		P1 has output E2	P has output E; P has specified output EP has primary output E
		A wasAssociatedWith P			P has participant A
		P1 wasInformedBy P2		P hasStep P1 P1 hasForSubStep P2	P1 has component process P2
		E1 specializationOf E			ID denotes E1, E2 etc.
	P2 intervalAfter P1			P2 time:intervalAfter P1	P2 preceded by P1
	P2 intervalMetBy P1				P2 immediately preceded by P1
	P1 intervalStartedBy P2				P1 starts with P2
	P1 intervalEndedBy P2				P1 ends with P2
			R sosa:hasProperty C	R sosa:hasProperty C	E has quality C
					I is about C; I is quality measurement of C
			O observedProperty C		No direct equivalent.
			O sosa:hasResult R	O sosa:hasResult R	P has specified output E (as above)

A: Agent C: Characteristic / Quality D:Date/Time E, E1, E2: Entity / Component I: Information / Observation ID: Identifier O: Observation P, P1, P2: Process / Action /Step R: Result

Prototype d'une recette dans FoodOn



Conclusion

Une collaboration internationale

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Damion Dooley [a,*], Magalie Weber [b], Liliana Ibanescu [c], Matthew Lange [d], Lauren Chan [e], Larisa Soldatova [f], Chen Yang [g], Robert Warren [h], Cogan Shimizu [i], Hande K. McGinty [j] and William Hsiao [a,k]

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[k] *Faculty of Health Sciences, Simon Fraser University, Burnaby, BC, Canada*

Conclusion

- Une collaboration internationale
- des communications dans IFOW

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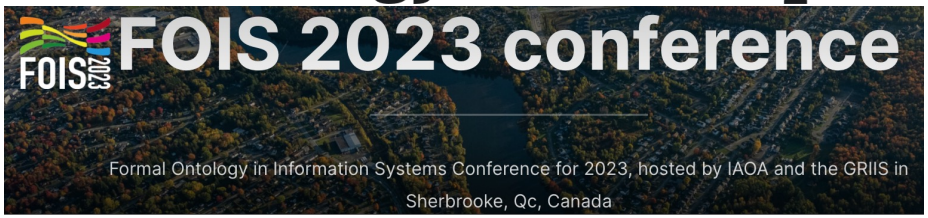

Conclusion

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- des communications dans IFOW
- OneHealth

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