

A large, light teal watermark of the word 'INFO' is visible in the background on the left side of the slide. The letters are outlined and have a circular element at the top right of the 'O'.

➤ Outils développés par InfoSol
pour l'interopérabilité de ses données

Séminaire Semantic Linked Data – 12/10/2021

Lattalais C., Le Bas C., Yahiaoui R., Schellenberger A., Bispo A.

➤ Introduction – Contexte réglementaire et enjeux

- InfoSol est une unité de service ayant en charge les programmes de cartographie et de surveillance des sols dans le cadre du GIS Sol.
- InfoSol a développé un système d'information sur les sols de France.
- Dans le cadre de l'application de la directive INSPIRE qui vise à développer une infrastructure spatiale sur les données environnementales, et de la loi sur la république numérique qui vise à développer les données ouvertes (opendata).

➤ **InfoSol doit donc diffuser ses données de manière interopérable et ouverte**



➤ Introduction – Interopérabilité des données à Infosol

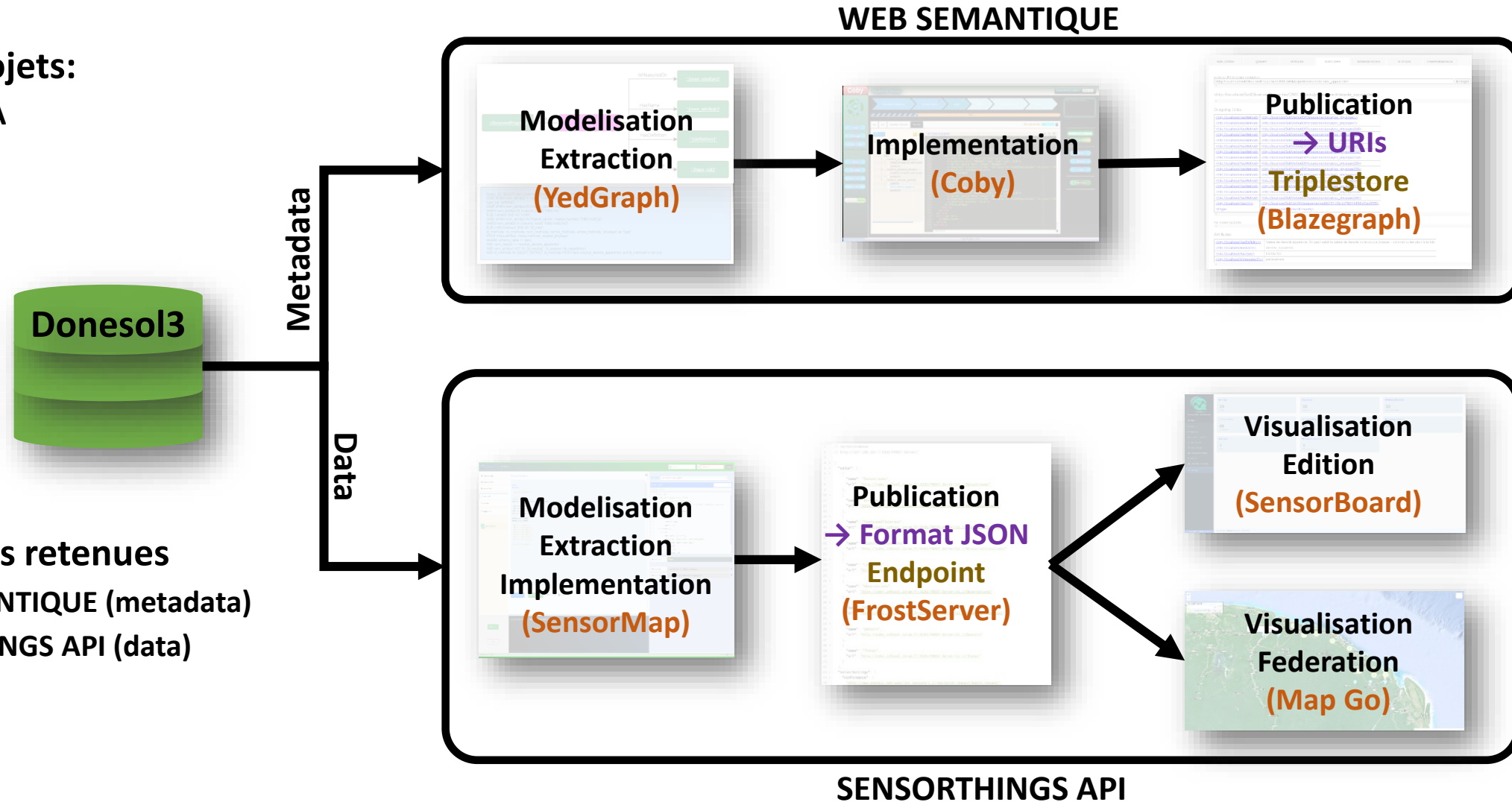
- Objectif: rendre les données et métadonnées de Donesol3 Interopérables

- Différents projets:

- FGU/SUPRA
- Data4C+
- EJP Soil

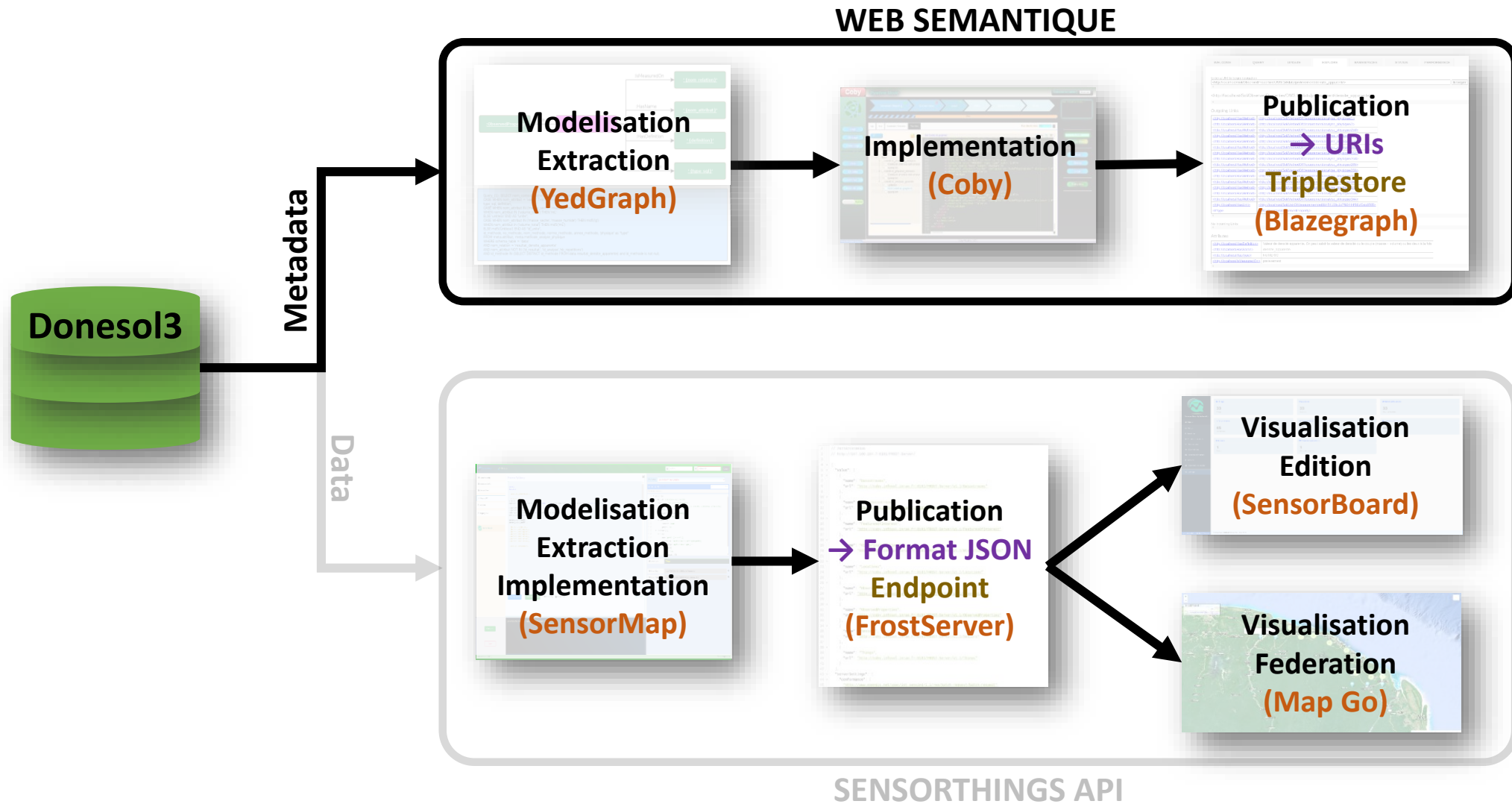
- 2 technologies retenues

- WEB SEMANTIQUE (metadata)
- SENSORTHINGS API (data)



SENSORTHINGS API

➤ Transition – Interopérabilité des données à Infosol



➤ Web Sémantique – Modélisation des données

```
Query (2): SELECT DISTINCT
CASE WHEN name in ('masse_seche', 'masse_humide') THEN 'g'
WHEN name in ('volume_total') THEN 'mL'
ELSE 'unitless' END AS 'unit',
CASE WHEN name in ('masse_seche', 'masse_humide') THEN md5('g')
WHEN name in ('volume_total') THEN md5('mL')
ELSE md5('unitless') END AS 'id_unite'
from meta.attribut
where schema_table = 'data' and nom_relation = 'resultat_densite_apparente' and name not in ('id_resultat', 'id_analyse', 'nb_repetitions', 'id_methode')
```

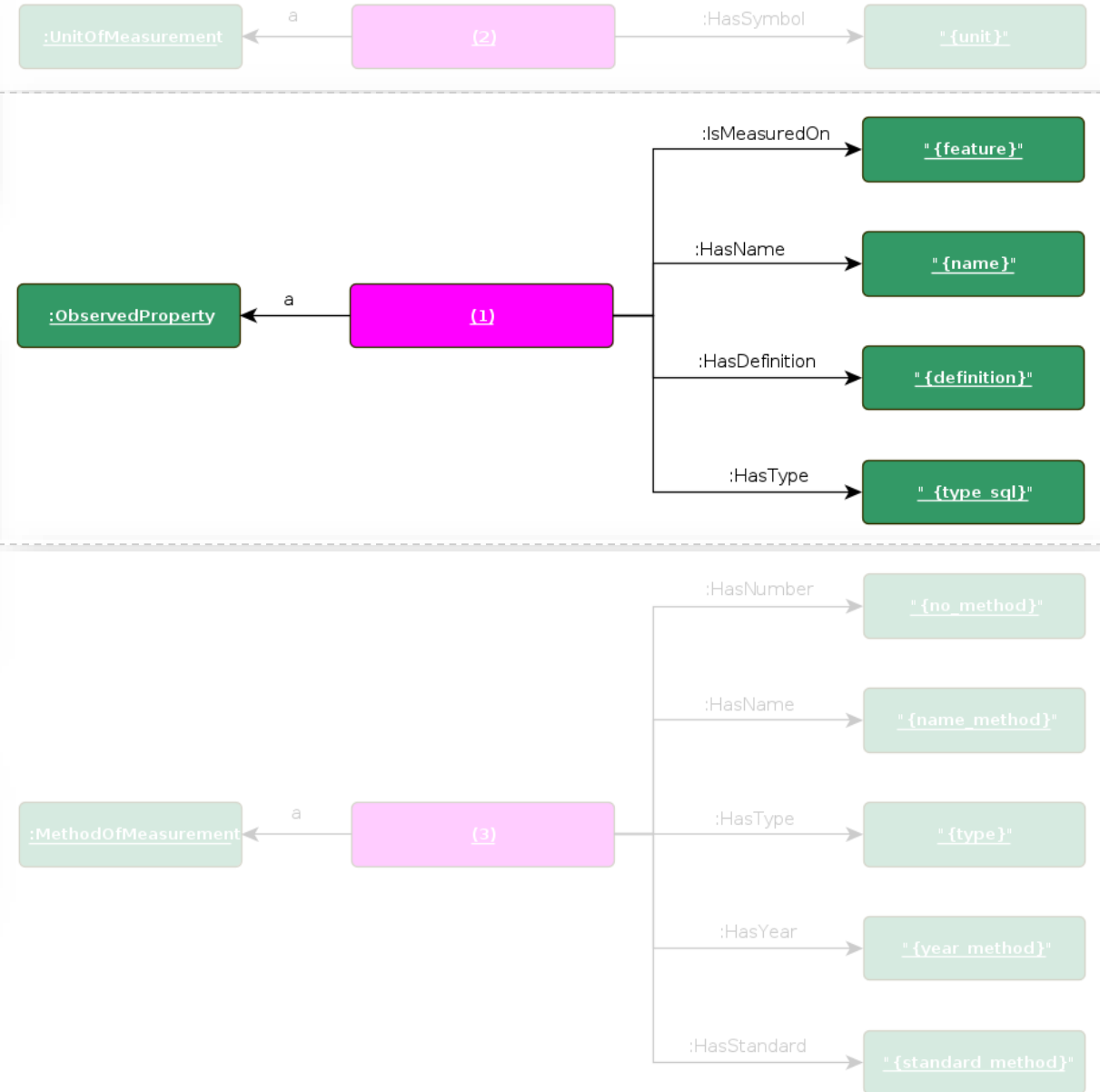
(2) Sol/UnitOfMeasurement/{id_unite}

```
Query (1): SELECT nom_contexte, schema_table, 'prelevement' as "feature",
CASE WHEN name = 'valeur' THEN 'densite_apparente' ELSE name END AS "name",
type_sql, definition,
CASE WHEN name IN ('masse_seche', 'masse_humide') THEN 'g'
WHEN name IN ('volume_total') THEN 'mL'
ELSE 'unitless' END AS "unit",
CASE WHEN name IN ('masse_seche', 'masse_humide') THEN md5('g')
WHEN name in ('volume_total') THEN md5('mL')
ELSE md5('unitless') END AS "id_unite",
id_methode, no_method, name_method, standard_method, year_method, 'physical' as "type"
FROM meta.attribut, meta.methode_analyse_physique
WHERE schema_table = 'data'
AND feature = 'resultat_densite_apparente'
AND name NOT IN ('id_resultat', 'id_analyse', 'nb_repetitions')
AND id_methode IN (SELECT DISTINCT id_methode FROM data.resultat_densite_apparente) and id_methode is not null;
```

(1) Sol/ObservedProperties/{nom_contexte}/{schema_table}/{nom_relation}/{name}

```
Query (3): SELECT id_methode, no_method, name_method, standard_method, year_method, 'physical' AS "type"
FROM meta.methode_analyse_physique
WHERE id_methode IN (SELECT DISTINCT id_methode FROM data.resultat_densite_apparente) and id_methode is not null;
```

(3) Sol/MethodOfMeasurement/analyse_physique/{id_methode}



INRAE

Outils développés par InfoSol pour l'interopérabilité de ses données

12/10/2021 - Séminaire Semantic Linked Data - Lattelais C., Le Bas C., Yahiaoui R., Schellenberger A., Bispo A.

Web Sémantique – Modélisation des données

```
Query (2): SELECT DISTINCT
CASE WHEN name in ('masse_seche', 'masse_humide') THEN 'g'
WHEN name in ('volume_total') THEN 'mL'
ELSE 'unitless' END AS 'unit',
CASE WHEN name in ('masse_seche', 'masse_humide') THEN md5('g')
WHEN name in ('volume_total') THEN md5('mL')
ELSE md5('unitless') END AS 'id_unite'
from meta.attribut
where schema_table = 'data' and nom_relation = 'resultat_densite_apparente' and name not in ('id_resultat', 'id_analyse', 'nb_repetitions', 'id_methode')
```

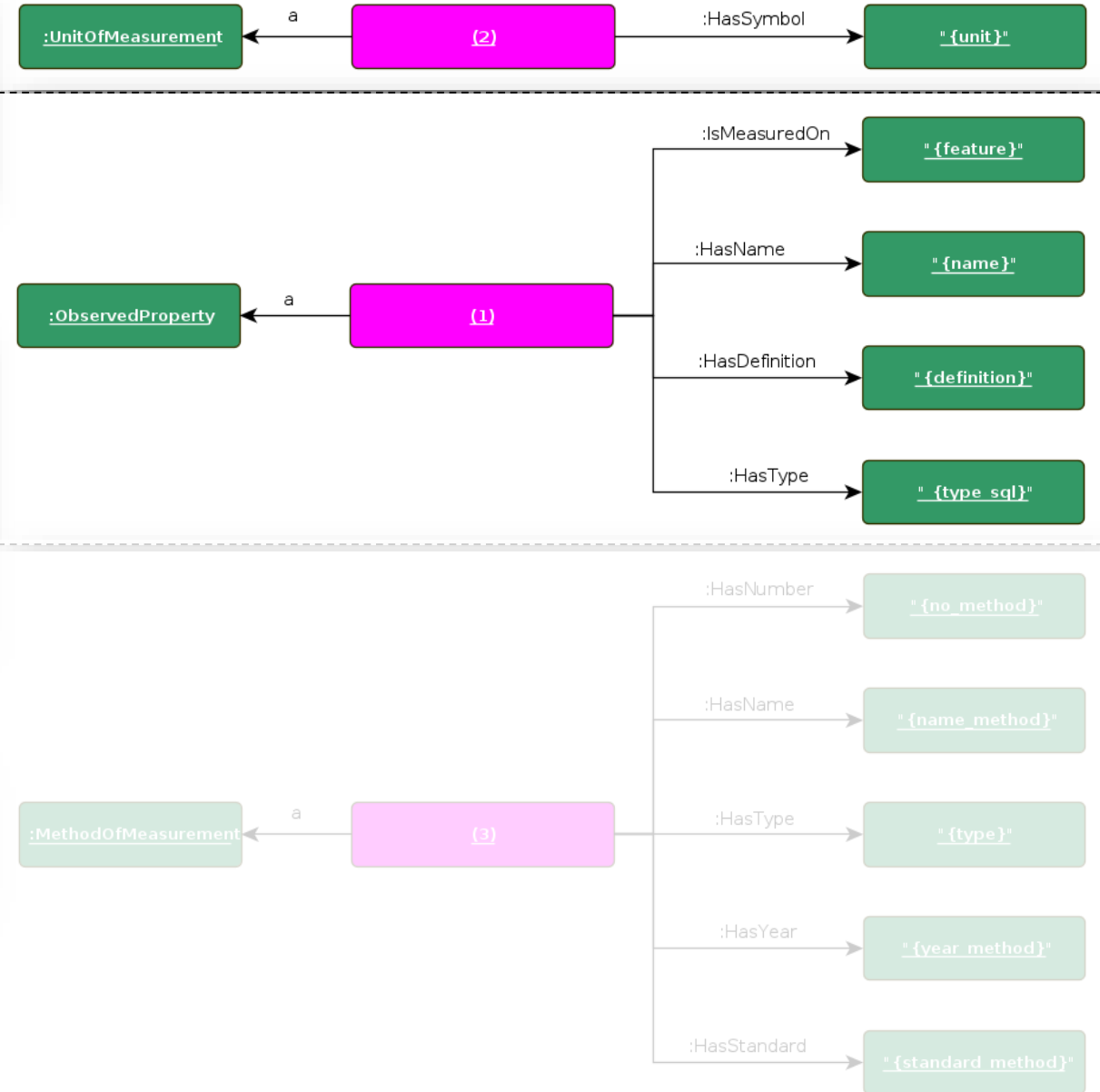
(2) Sol/UnitOfMeasurement/{id_unite}

```
Query (1): SELECT nom_contexte, schema_table, 'prelevement' as "feature",
CASE WHEN name = 'valeur' THEN 'densite_apparente' ELSE name END AS "name",
type_sql, definition,
CASE WHEN name IN ('masse_seche', 'masse_humide') THEN 'g'
WHEN name IN ('volume_total') THEN 'mL'
ELSE 'unitless' END AS "unit",
CASE WHEN name IN ('masse_seche', 'masse_humide') THEN md5('g')
WHEN name in ('volume_total') THEN md5('mL')
ELSE md5('unitless') END AS "id_unite",
id_methode, no_method, name_method, standard_method, year_method, 'physical' as "type"
FROM meta.attribut, meta.methode_analyse_physique
WHERE schema_table = 'data'
AND feature = 'resultat_densite_apparente'
AND name NOT IN ('id_resultat', 'id_analyse', 'nb_repetitions')
AND id_methode IN (SELECT DISTINCT id_methode FROM data.resultat_densite_apparente) and id_methode is not null;
```

(1) Sol/ObservedProperties/{nom_contexte}/{schema_table}/{nom_relation}/{name}

```
Query (3): SELECT id_methode, no_method, name_method, standard_method, year_method, 'physical' AS "type"
FROM meta.methode_analyse_physique
WHERE id_methode IN (SELECT DISTINCT id_methode FROM data.resultat_densite_apparente) and id_methode is not null;
```

(3) Sol/MethodOfMeasurement/analyse_physique/{id_methode}



INRAE

Outils développés par InfoSol pour l'interopérabilité de ses données

12/10/2021 - Séminaire Semantic Linked Data - Lattelais C., Le Bas C., Yahiaoui R., Schellenberger A., Bispo A.

➤ Web Sémantique – Modélisation des données

```
Query (2): SELECT DISTINCT
CASE WHEN name in ('masse_seche', 'masse_humide') THEN 'g'
WHEN name in ('volume_total') THEN 'mL'
ELSE 'unitless' END AS 'unit',
CASE WHEN name in ('masse_seche', 'masse_humide') THEN md5('g')
WHEN name in ('volume_total') THEN md5('mL')
ELSE md5('unitless') END AS "id_unite"
from meta.attribut
where schema_table = 'data' and nom_relation = 'resultat_densite_apparente' and name not in ('id_resultat', 'id_analyse','nb_repetitions','id_methode')
```

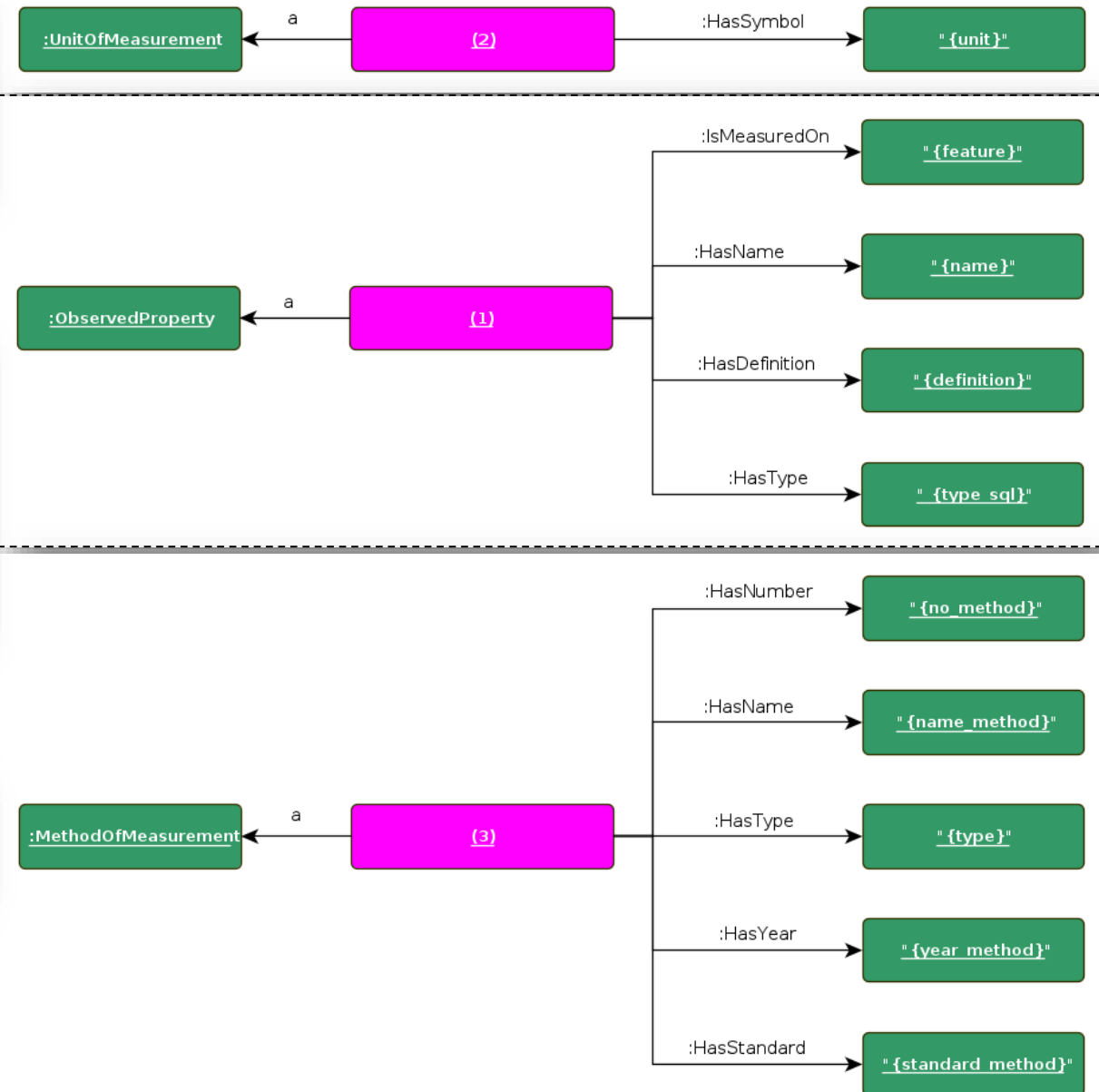
(2) Sol/UnitOfMeasurement/{id_unite}

```
Query (1): SELECT nom_contexte, schema_table, 'prelevement' as "feature",
CASE WHEN name = 'valeur' THEN 'densite_apparente' ELSE name END AS "name",
type_sql, definition,
CASE WHEN name IN ('masse_seche', 'masse_humide') THEN 'g'
WHEN name IN ('volume_total') THEN 'mL'
ELSE 'unitless' END AS "unit",
CASE WHEN name IN ('masse_seche', 'masse_humide') THEN md5('g')
WHEN name in ('volume_total') THEN md5('mL')
ELSE md5('unitless') END AS "id_unite",
id_methode, no_method, name_method, standard_method, year_method, 'physical' as "type"
FROM meta.attribut, meta.methode_analyse_physique
WHERE schema_table = 'data'
AND feature = 'resultat_densite_apparente'
AND name NOT IN ('id_resultat', 'id_analyse','nb_repetitions')
AND id_methode IN (SELECT DISTINCT id_methode FROM data.resultat_densite_apparente) and id_methode is not null;
```

(1) Sol/ObservedProperties/{nom_contexte}/{schema_table}/{nom_relation}/{name}

```
Query (3): SELECT id_methode, no_method, name_method, standard_method, year_method, 'physical' AS "type"
FROM meta.methode_analyse_physique
WHERE id_methode IN (SELECT DISTINCT id_methode FROM data.resultat_densite_apparente) and id_methode is not null;
```

(3) Sol/MethodOfMeasurement/analyse_physique/{id_methode}



INRAE

Outils développés par InfoSol pour l'interopérabilité de ses données

12/10/2021 - Séminaire Semantic Linked Data - Lattelais C., Le Bas C., Yahiaoui R., Schellenberger A., Bispo A.

➤ Web Sémantique – Modélisation des données

```
Query (2): SELECT DISTINCT
CASE WHEN name in ('masse_seche', 'masse_humide') THEN 'g'
WHEN name in ('volume_total') THEN 'mL'
ELSE 'unitless' END AS "unit",
CASE WHEN name in ('masse_seche', 'masse_humide') THEN md5('g')
WHEN name in ('volume_total') THEN md5('mL')
ELSE md5('unitless') END AS "id_unite"
from meta.attribut
where schema_table = 'data' and nom_relation = 'resultat_densite_apparente' and name not in ('id_resultat', 'id_analyse', 'nb_repetitions', 'id_methode')
```

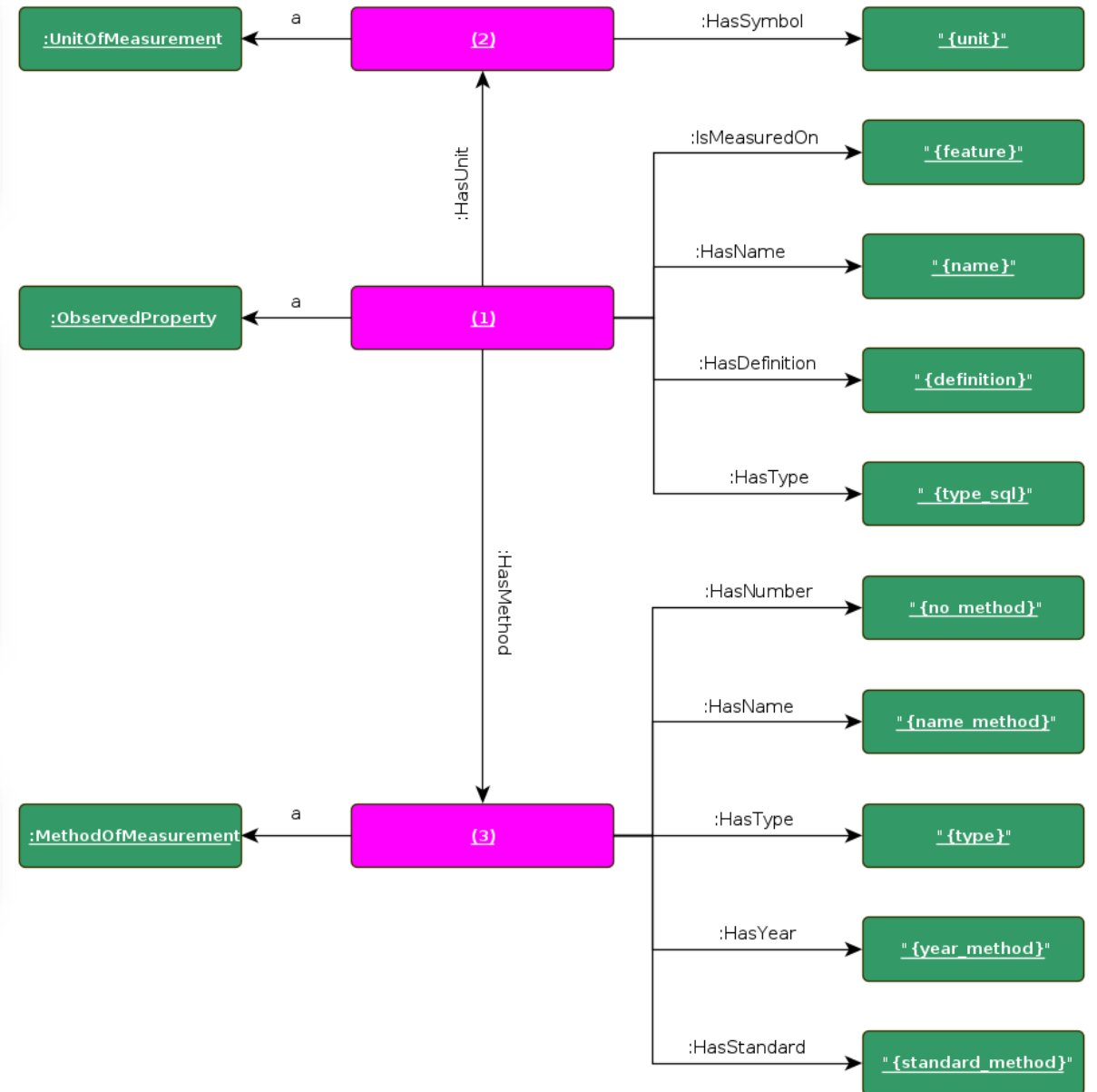
(2) Sol/UnitOfMeasurement/{id_unite}

```
Query (1): SELECT nom_contexte, schema_table, 'prelevement' as "feature",
CASE WHEN name = 'valeur' THEN 'densite_apparente' ELSE name END AS "name",
type_sql, definition,
CASE WHEN name in ('masse_seche', 'masse_humide') THEN 'g'
WHEN name in ('volume_total') THEN 'mL'
ELSE 'unitless' END AS "unit",
CASE WHEN name in ('masse_seche', 'masse_humide') THEN md5('g')
WHEN name in ('volume_total') THEN md5('mL')
ELSE md5('unitless') END AS "id_unite",
id_methode, no_method, name_method, standard_method, year_method, 'physical' as "type"
FROM meta.attribut, meta.methode_analyse_physique
WHERE schema_table = 'data'
AND feature = 'resultat_densite_apparente'
AND name NOT IN ('id_resultat', 'id_analyse', 'nb_repetitions')
AND id_methode IN (SELECT DISTINCT id_methode FROM data.resultat_densite_apparente) and id_methode is not null;
```

(1) Sol/ObservedProperties/{nom_contexte}/{schema_table}/{nom_relation}/{name}

```
Query (3): SELECT id_methode, no_method, name_method, standard_method, year_method, 'physical' AS "type"
FROM meta.methode_analyse_physique
WHERE id_methode IN (SELECT DISTINCT id_methode FROM data.resultat_densite_apparente) and id_methode is not null;
```

(3) Sol/MethodOfMeasurement/analyse_physique/{id_methode}

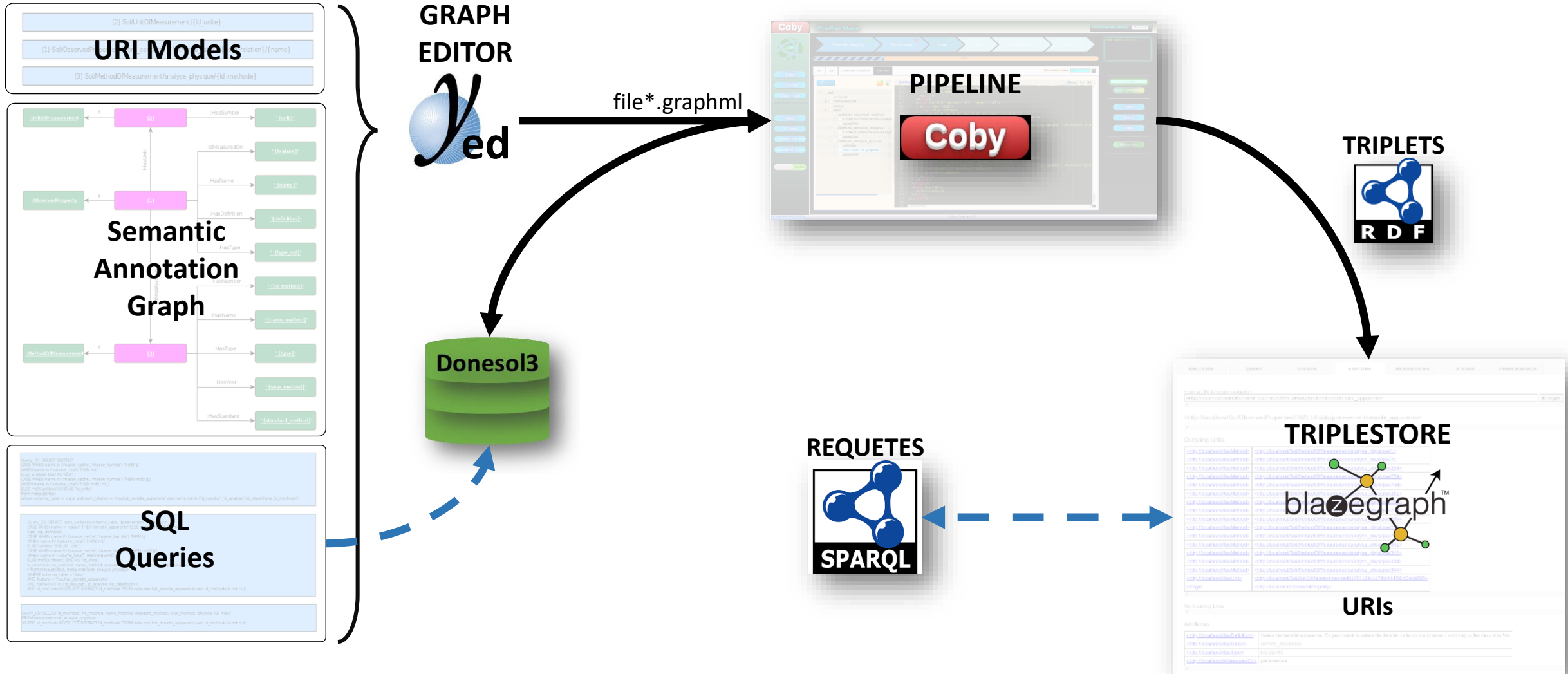


INRAE

Outils développés par InfoSol pour l'interopérabilité de ses données

12/10/2021 - Séminaire Semantic Linked Data - Lattelais C., Le Bas C., Yahiaoui R., Schellenberger A., Bispo A.

➤ Web Sémantique – Publication des données



INRAE

Outils développés par InfoSol pour l'interopérabilité de ses données

12/10/2021 - Séminaire Semantic Linked Data - Lattelais C., Le Bas C., Yahiaoui R., Schellenberger A., Bispo A.

➤ Web Sémantique – Déploiement du pipeline Coby

- Installer les paquets suivants: java; curl; psql; mvn; awk; gawk; fuser; lsof; xxd.
- Cloner le projet depuis le git online (<https://forgemia.inra.fr/infosol/SolEil>) dans un répertoire:

```
$ git clone <SSH or HTTPS link from the git>
```

▪ Host Networking

```
docker run -d -p 2345:5432 --rm --name db-auth ecoinfo/coby-db-auth ; \
\
docker run --net host -d --rm \
--name coby \
-e HTTPS_PORT=8585 \
-e DB_URL_AUTHENTICATION="jdbc:postgresql://localhost:2345/coby-db-auth" \
-e DB_LOGIN_AUTHENTICATION=postgres \
-e DB_PASSWORD_AUTHENTICATION=admin \
-v $(pwd)/src/SI/./opt/coby/pipeline/SI \
-v $(pwd)/src/orchestrators/./opt/coby/pipeline/orchestrators \
-v $(pwd)/infra/coby/./opt/coby/jaxy-server/overridden/ \
-v $(pwd)/doi_export/./var/doi-nfs-export/ \
ecoinfo/coby:1.6 /opt/coby/jaxy-server/overridden/run_server.sh
```

- Go to the URL: <https://localhost:8585>

▪ Isolated Network

```
docker run -d -p 2345:5432 --rm --name db-auth ecoinfo/coby-db-auth ; \
\
docker run -d --rm \
--name coby \
-p 8181:8181 \
-p 8585:8585 \
-p 7777:7777 \
-p 8888:8888 \
-e HTTPS_PORT=8585 \
-e DB_URL_AUTHENTICATION="jdbc:postgresql://db-auth:5432/coby-db-auth" \
-e DB_LOGIN_AUTHENTICATION=postgres \
-e DB_PASSWORD_AUTHENTICATION=admin \
-v $(pwd)/src/SI/./opt/coby/pipeline/SI \
-v $(pwd)/src/orchestrators/./opt/coby/pipeline/orchestrators \
-v $(pwd)/infra/coby/./opt/coby/jaxy-server/overridden/ \
-v $(pwd)/doi_export/./var/doi-nfs-export/ \
--link db-auth:db-auth \
ecoinfo/coby:1.6 /opt/coby/jaxy-server/overridden/run_server.sh
```



➤ Web Sémantique – Publication des données via Coby

The screenshot displays the Coby Pipeline Mode interface. At the top, a progress bar shows the pipeline steps: Generate Mapping (checked), Extract data (failed), Load (checked), Infer, Sparql Process, and Store. A 25% progress indicator is shown below the steps. The main area is divided into a file explorer on the left and a code editor on the right. The file explorer shows a directory structure under 'sol' with files like 'prefix.txt', 'connection.txt', 'output', and 'input'. The code editor displays the content of 'Sol-CodeList.graphml', which is a GraphML file. A red dashed box highlights the code editor, and a white box with the text 'file*.graphml' is overlaid on it. On the right side of the interface, there are buttons for 'Run Synthesis', 'Jobs', 'Status', 'Logs', and 'Extraction'. The bottom status bar shows the URL 'https://localhost:8585/' and the text 'Coby Pipeline (CC)'.

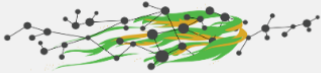



INRAE

Outils développés par InfoSol pour l'interopérabilité de ses données

12/10/2021 - Séminaire Semantic Linked Data - Lattelais C., Le Bas C., Yahiaoui R., Schellenberger A., Bispo A.

Web Sémantique – Publication des données: Blazegraph



blazegraph workbench
ultra-scalable, high-performance database from Blazegraph


SEARCH:

WELCOME QUERY UPDATE EXPLORE NAMESPACES STATUS PERFORMANCE Current namespace: Sol

Wiki - SPARQL Query Namespace shortcuts: Bigdata | W3C | Dublin Core | Social/Other | Custom | Edit

```
1 SELECT ?observedProperty ?methodOfMeasurement ?UnitOfMeasurement
2
3 {
4
5   ?observedProperty <http://localhost/HasMethod> ?methodOfMeasurement.
6
7   ?observedProperty <http://localhost/HasUnit> ?UnitOfMeasurement.
8
9 }
10
```

Requête SPARQL




[Advanced features](#)

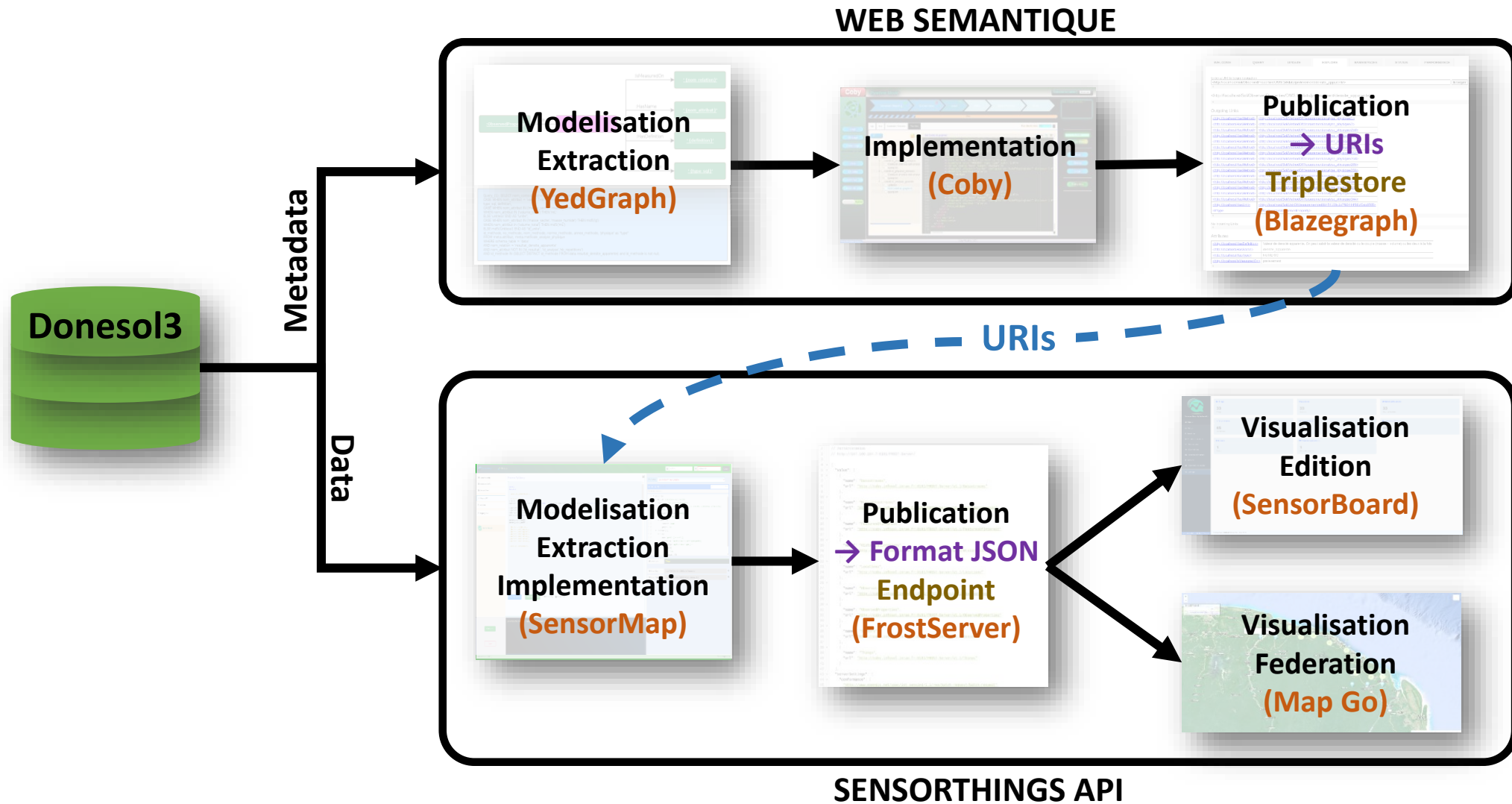
Execute Clear

observedProperty	methodOfMeasurement	UnitOfMeasurement
http://localhost/Sol/ObservedProperties/DW3.14/data/orelevement/densite_apparente/	http://localhost/Sol/MethodOfMeasurement/analyse_physique/1/	http://localhost/Sol/UnitOfMeasurement/ed81454169c1d7f80444f98cf0ab8705/
http://localhost/Sol/ObservedProperties/DW3.14/data/orelevement/densite_apparente/	http://localhost/Sol/MethodOfMeasurement/analyse_physique/2/	http://localhost/Sol/UnitOfMeasurement/ed81454169c1d7f80444f98cf0ab8705/
http://localhost/Sol/ObservedProperties/DW3.14/data/orelevement/densite_apparente/	http://localhost/Sol/MethodOfMeasurement/analyse_physique/258/	http://localhost/Sol/UnitOfMeasurement/ed81454169c1d7f80444f98cf0ab8705/
http://localhost/Sol/ObservedProperties/DW3.14/data/orelevement/densite_apparente/	http://localhost/Sol/MethodOfMeasurement/analyse_physique/259/	http://localhost/Sol/UnitOfMeasurement/ed81454169c1d7f80444f98cf0ab8705/
http://localhost/Sol/ObservedProperties/DW3.14/data/orelevement/densite_apparente/	http://localhost/Sol/MethodOfMeasurement/analyse_physique/260/	http://localhost/Sol/UnitOfMeasurement/ed81454169c1d7f80444f98cf0ab8705/
http://localhost/Sol/ObservedProperties/DW3.14/data/orelevement/densite_apparente/	http://localhost/Sol/MethodOfMeasurement/analyse_physique/261/	http://localhost/Sol/UnitOfMeasurement/ed81454169c1d7f80444f98cf0ab8705/
http://localhost/Sol/ObservedProperties/DW3.14/data/orelevement/densite_apparente/	http://localhost/Sol/MethodOfMeasurement/analyse_physique/262/	http://localhost/Sol/UnitOfMeasurement/ed81454169c1d7f80444f98cf0ab8705/
http://localhost/Sol/ObservedProperties/DW3.14/data/orelevement/densite_apparente/	http://localhost/Sol/MethodOfMeasurement/analyse_physique/263/	http://localhost/Sol/UnitOfMeasurement/ed81454169c1d7f80444f98cf0ab8705/
http://localhost/Sol/ObservedProperties/DW3.14/data/orelevement/densite_apparente/	http://localhost/Sol/MethodOfMeasurement/analyse_physique/265/	http://localhost/Sol/UnitOfMeasurement/ed81454169c1d7f80444f98cf0ab8705/
http://localhost/Sol/ObservedProperties/DW3.14/data/orelevement/densite_apparente/	http://localhost/Sol/MethodOfMeasurement/analyse_physique/266/	http://localhost/Sol/UnitOfMeasurement/ed81454169c1d7f80444f98cf0ab8705/
http://localhost/Sol/ObservedProperties/DW3.14/data/orelevement/densite_apparente/	http://localhost/Sol/MethodOfMeasurement/analyse_physique/267/	http://localhost/Sol/UnitOfMeasurement/ed81454169c1d7f80444f98cf0ab8705/
http://localhost/Sol/ObservedProperties/DW3.14/data/orelevement/densite_apparente/	http://localhost/Sol/MethodOfMeasurement/analyse_physique/341/	http://localhost/Sol/UnitOfMeasurement/ed81454169c1d7f80444f98cf0ab8705/
http://localhost/Sol/ObservedProperties/DW3.14/data/orelevement/densite_apparente/	http://localhost/Sol/MethodOfMeasurement/analyse_physique/342/	http://localhost/Sol/UnitOfMeasurement/ed81454169c1d7f80444f98cf0ab8705/
http://localhost/Sol/ObservedProperties/DW3.14/data/orelevement/densite_apparente/	http://localhost/Sol/MethodOfMeasurement/analyse_physique/343/	http://localhost/Sol/UnitOfMeasurement/ed81454169c1d7f80444f98cf0ab8705/
http://localhost/Sol/ObservedProperties/DW3.14/data/orelevement/densite_apparente/	http://localhost/Sol/MethodOfMeasurement/analyse_physique/344/	http://localhost/Sol/UnitOfMeasurement/ed81454169c1d7f80444f98cf0ab8705/
http://localhost/Sol/ObservedProperties/DW3.14/data/orelevement/id_methode/	http://localhost/Sol/MethodOfMeasurement/analyse_physique/1/	http://localhost/Sol/UnitOfMeasurement/ed81454169c1d7f80444f98cf0ab8705/
http://localhost/Sol/ObservedProperties/DW3.14/data/orelevement/id_methode/	http://localhost/Sol/MethodOfMeasurement/analyse_physique/2/	http://localhost/Sol/UnitOfMeasurement/ed81454169c1d7f80444f98cf0ab8705/

Triplets RDF



➤ Transition – Interopérabilité des données à Infosol



> Conclusion

- **Travaux en cours**
- **Amélioration continue des outils**
- **Nécessité de créer une ontologie sol référencée W3C notamment pour publier les données (pas seulement les métadonnées)**
 - Travail en cours dans des projets internationaux:
 - EJP SOIL
 - ESIP SOIL Informatics



MERCI POUR VOTRE ATTENTION



INRAE

Outils développés par InfoSol pour l'interopérabilité de ses données

12/10/2021 - Séminaire Semantic Linked Data - Lattelais C., Le Bas C., Yahiaoui R., Schellenberger A., Bispo A.