

```
@prefix icc: <https://w3id.org/fair/icc/terms/> .
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@prefix sio: <http://semanticscience.org/resource/> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
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@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
@prefix dct: <http://purl.org/dc/terms/> .
@prefix pav: <http://purl.org/pav/> .
@prefix prov: <http://www.w3.org/ns/prov#> .
@prefix np: <http://www.nanopub.org/nschema#> .
@prefix npx: <http://purl.org/nanopub/x/> .
@prefix orcid: <https://orcid.org/> .
@prefix foaf: <http://xmlns.com/foaf/0.1/> .
```

Les principes FAIR

```
dct:hasPart a owl:ObjectProperty .
```

```
sio:000090 rdfs:label "specification"@en .
```

François Pelletier

28 novembre 2023

```
<https://w3id.org/fair/principles/terms/FAIR-Vocabulary> a <http://www.w3.org/2002/07/owl#Ontology>;
<http://purl.org/dc/terms/creator> <https://orcid.org/0000-0002-1267-8234> <https://orcid.org/0000-0003-4727-9435>;
<http://purl.org/dc/terms/description> "This is (a) (a) describing the FAIR principles.";
<http://purl.org/dc/terms/license> <http://creativecommons.org/licenses/by/4.0/>;
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<http://purl.org/vocab/vann/preferredNamespaceUri> "https://w3id.org/fair/principles/terms/";
<http://www.w3.org/2000/01/rdf-schema#isDefinedBy> <https://w3id.org/fair/principles/latest/FAIR-Vocabulary>;
<http://www.w3.org/2000/01/rdf-schema#seeAlso> <https://w3id.org/fair/principles/terms/FAIR>,
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Objectif

Rendre les données de recherche réutilisables par les individus et les machines.

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Enjeux actuels avec les données

- Données massives
- Complexité des données
- Trouver ce qui existe déjà
- Déplacer et stocker les données

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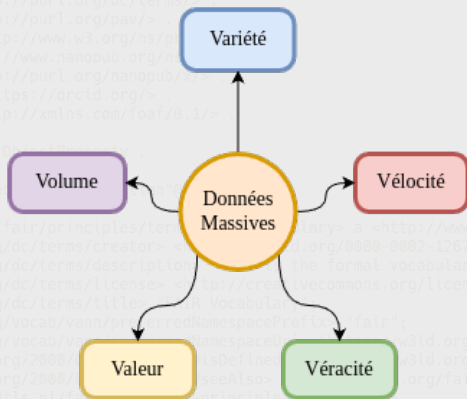
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Données massives



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```

Complexité des données

- Multidisciplinaires
- Méthodes et instruments complexes
- Logiciels et matériel requis
- Environnement légal et éthique


```
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```

```
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```

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  <https://www.dtls.nl/fair-data/fair-principles-explained/> .
```

Trouver ce qui existe déjà


– Trouver un article


– Bibliothèque : Sofia 

– Google Scholar

– arXiv

– Télécharger l'article

– Bibliothèque ,

– Payer 

–  


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@prefix owl: <http://www.w3.org/2002/07/owl#> .
```

Trouver ce qui existe déjà

- Trouver les données qui vont avec :
- Pas évident 🧑🏻
- Ouvrir les données :
- Surprise 🐼

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```

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```

Déplacer et stocker les données

- Médias physiques : Livres, Microfiches, VHS, Disques 🐘
- Enjeu de dégradation des supports
- Logiciels partagés Microsoft 365 : SharePoint, Teams, ... ⚡
- Enjeu de pérennité et d'authenticité
- Risque de fouillis


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```

- Serveurs : VALERIA, Alliance (Calcul Canada), SFTP, GLOBUS, S3, GitLab, Pixel/Subversion 
- Enjeux d'accès, permissions, complexité ... ça s'apprend, mais c'est moins intuitif!

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- En savoir plus après aujourd'hui!

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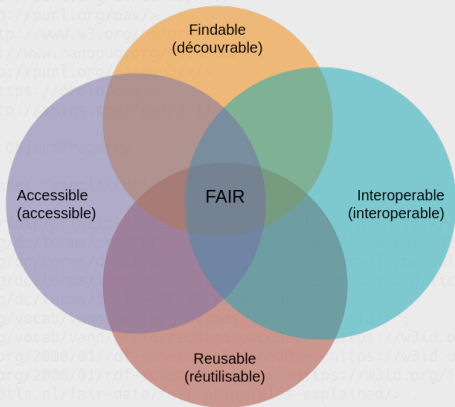
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Que signifie FAIR ?



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@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
@prefix dct: <http://purl.org/dc/terms/> .
@prefix pav: <http://purl.org/pav/terms/> .
@prefix prov: <http://www.w3.org/ns/prov#> .
@prefix np: <http://www.nature.com/terms/ns/np/> .
@prefix npx: <http://purl.org/net/ncname/ns/xs#> .
@prefix orcid: <https://orcid.org/> .
@prefix foaf: <http://xmlns.com/foaf/0.1/> .
```

Définitions formelles

- FAIR a été défini par Wilkinson, M. D. et al. (2016)
- Définition du Savoir Libre qui a inspiré FAIR, par l'Open Knowledge Foundation.

```
dct:hasPart a owl:ObjectProperty .
```

```
sio:000090 rdfs:label "specification"@en .
```

```
<https://w3id.org/fair/principles/terms/FAIR-Vocabulary> a <http://www.w3.org/2002/07/owl#Ontology>;
  <http://purl.org/dc/terms/creator> <https://orcid.org/0000-0002-1267-0234>, <https://orcid.org/0000-0003-4727-9435>;
  <http://purl.org/dc/terms/description> "This is the formal vocabulary (ontology) describing the FAIR principles.";
  <http://purl.org/dc/terms/license> <http://creativecommons.org/licenses/by/4.0/>;
  <http://purl.org/dc/terms/title> "FAIR Vocabulary";
  <http://purl.org/vocab/vann/preferredNamespacePrefix> "fair";
  <http://purl.org/vocab/vann/preferredNamespaceUri> "https://w3id.org/fair/principles/terms/";
  <http://www.w3.org/2000/01/rdf-schema#isDefinedBy> <https://w3id.org/fair/principles/latest/FAIR-Vocabulary>;
  <http://www.w3.org/2000/01/rdf-schema#seeAlso> <https://w3id.org/fair/principles/terms/FAIR>,
  <https://www.dtls.nl/fair-data/fair-principles-explained/> .
```

Qu'est-ce qui est concerné par FAIR ?

Tous les actifs numériques produits par des activités de recherche

- Données quantitatives et qualitatives
- Figures
- Multimédia
- Texte
- Code informatique
- Protocole de recherche
- Plans et instructions de fabrication

Findable (découvrable)

– Identifiant unique

– DOI : Digital object identifier

– Pour des actifs numériques de recherche

– DOI Handbook

– URI : Uniform Resource Identifier :

– Pour tout ce qui est accessible sur le web

– Inclus tous les fichiers et pages web

– S'applique aussi à des concepts et des entités.

– Fondement du web sémantique (web 3.0)


```
@prefix icc: <https://w3id.org/fair/icc/terms/> .
@prefix fair: <https://w3id.org/fair/principles/terms/> .
@prefix sio: <http://semanticscience.org/resource/> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix owl: <http://www.w3.org/2002/07/owl#> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
@prefix dct: <http://purl.org/dc/terms/> .
@prefix pav: <http://purl.org/pav/terms/> .
@prefix prov: <http://www.w3.org/ns/prov#> .
@prefix np: <http://www.nlns.nl/ns/nsi-core/terms/> .
@prefix npx: <http://purl.org/net/np/ns#> .
@prefix orcid: <https://orcid.org/> .
@prefix foaf: <http://xmlns.com/foaf/0.1/> .
```

Findable (découvrable)

– Métadonnées

– Plus elles sont détaillées, plus elles renseignent les moteurs de recherche

– Schema.org : Guide de métadonnées et vocabulaires

– Wikidata : Un exemple de structure

– DataCite

```
dct:hasPart a owl:ObjectProperty ;
sio:000090 rdfs:label "specificity" ;

<https://w3id.org/fair/principles/terms/FAIR-Vocabulary> a <http://www.w3.org/2002/07/owl#Ontology>;
  <http://purl.org/dc/terms/creator> <https://orcid.org/0000-0002-1267-0234>, <https://orcid.org/0000-0003-4727-9435>;
  <http://purl.org/dc/terms/description> "This is the formal vocabulary (ontology) describing the FAIR principles.";
  <http://purl.org/dc/terms/license> <http://creativecommons.org/licenses/by/4.0/>;
  <http://purl.org/dc/terms/title> "FAIR Vocabulary";
  <http://purl.org/vocab/vann/preferredNamespacePrefix> "fair";
  <http://purl.org/vocab/vann/preferredNamespaceUri> "https://w3id.org/fair/principles/terms/";
  <http://www.w3.org/2000/01/rdf-schema#isDefinedBy> <https://w3id.org/fair/principles/latest/FAIR-Vocabulary>;
  <http://www.w3.org/2000/01/rdf-schema#seeAlso> <https://w3id.org/fair/principles/terms/FAIR>,
  <https://www.dtls.nl/fair-data/fair-principles-explained/> .
```

Findable (découvrable)

– Indexation

– Dépôts de données

– Borealis

– Dataverse

– Zenodo

– CKAN - À installer sur son propre serveur. Utilisé dans plusieurs gouvernements dont le Canada, le Québec et la Ville de Montréal.

Findable (découvrable)

– Indexation

– Moteurs de recherche

– Google Datasets

– Plateformes grand public

– Data World - Dépôt de données commercial

– Kaggle - Données de concours, la documentation et les méta-données peuvent être limitées

```
@prefix icc: <https://w3id.org/fair/icc/terms/> .
@prefix fair: <https://w3id.org/fair/principles/terms/> .
@prefix sio: <http://semanticscience.org/resource/> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix owl: <http://www.w3.org/2002/07/owl#> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
@prefix dct: <http://purl.org/dc/terms/> .
@prefix pav: <http://purl.org/dc/terms/pav/> .
@prefix prov: <http://www.w3.org/ns/prov#> .
@prefix np: <http://www.northernperceptions.com/ns/> .
@prefix npx: <http://purl.org/dc/terms/npx/> .
@prefix orcid: <https://orcid.org/> .
@prefix foaf: <http://xmlns.foaf.org/> .
```

Accessible

- Métadonnées
- Normalisées (j'y reviens)
- Identifiant unique (URI, mentionné ci-haut)
- Licence d'utilisation
- Open Database License
- Creative Commons License

```
<https://w3id.org/fair/principles/terms/FAIR-Vocabulary> a <http://www.w3.org/2002/07/owl#Ontology>;
<http://purl.org/dc/terms/creator> <https://orcid.org/0000-0002-1267-0234>, <https://orcid.org/0000-0003-4727-9435>;
<http://purl.org/dc/terms/description> "This is the formal vocabulary (ontology) describing the FAIR principles.";
<http://purl.org/dc/terms/license> <http://creativecommons.org/licenses/by/4.0/>;
<http://purl.org/dc/terms/title> "FAIR Vocabulary";
<http://purl.org/vocab/vann/preferredNamespacePrefix> "fair";
<http://purl.org/vocab/vann/preferredNamespaceUri> "https://w3id.org/fair/principles/terms/";
<http://www.w3.org/2000/01/rdf-schema#isDefinedBy> <https://w3id.org/fair/principles/latest/FAIR-Vocabulary>;
<http://www.w3.org/2000/01/rdf-schema#seeAlso> <https://w3id.org/fair/principles/terms/FAIR>,
<https://www.dtls.nl/fair-data/fair-principles-explained/> .
```

Accessible

- Protocole d'accès aux métadonnées
- Caractéristiques
- Libre : Aucune restriction d'usage
- Ouvert : Documenté
- Universel : Utilisable avec plusieurs médias
- Permission : Authentification et Autorisation
- Exemples : HTTPS, FTP, Courriel, Téléphone, Poste

```
@prefix icc: <https://w3id.org/fair/icc/terms/> .
@prefix fair: <https://w3id.org/fair/principles/terms/> .
@prefix sio: <http://semanticscience.org/resource/> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix owl: <http://www.w3.org/2002/07/owl#> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
@prefix dct: <http://purl.org/dc/terms/> .
@prefix pav: <http://purl.org/pav/terms/> .
@prefix prov: <http://www.w3.org/ns/prov#> .
@prefix np: <http://www.nature.com/terms/> .
@prefix npx: <http://purl.org/net/terms/> .
@prefix orcid: <https://orcid.org/> .
@prefix foaf: <http://xmlns.com/foaf/0.1/> .
```

Accessible

- Métadonnées indépendantes des données
- Si les données expirent ou on reçoit une demande de suppression, les métadonnées gardent trace
- Publiques (si les données sont confidentielles)

```
dct:hasPart a owl:ObjectProperty .
```

```
sio:000090 rdfs:label "specification"@en .
```

```
<https://w3id.org/fair/principles/terms/FAIR-Vocabulary> a <http://www.w3.org/2002/07/owl#Ontology>;
  <http://purl.org/dc/terms/creator> <https://orcid.org/0000-0002-1267-0234>, <https://orcid.org/0000-0003-4727-9435>;
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  <http://purl.org/dc/terms/license> <http://creativecommons.org/licenses/by/4.0/>;
  <http://purl.org/dc/terms/title> "FAIR Vocabulary";
  <http://purl.org/vocab/vann/preferredNamespacePrefix> "fair";
  <http://purl.org/vocab/vann/preferredNamespaceUri> "https://w3id.org/fair/principles/terms/";
  <http://www.w3.org/2000/01/rdf-schema#isDefinedBy> <https://w3id.org/fair/principles/latest/FAIR-Vocabulary>;
  <http://www.w3.org/2000/01/rdf-schema#seeAlso> <https://w3id.org/fair/principles/terms/FAIR>,
  <https://www.dtls.nl/fair-data/fair-principles-explained/> .
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@prefix owl: <http://www.w3.org/2002/07/owl#> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
@prefix dct: <http://purl.org/dc/terms/> .
@prefix pav: <http://purl.org/dc/terms/pav/> .
@prefix prov: <http://www.w3.org/ns/prov#> .
@prefix np: <http://www.nature.com/terms/ns#> .
@prefix npx: <http://purl.org/dc/terms/npx/> .
@prefix orcid: <https://orcid.org/> .
@prefix foaf: <http://xmlns.foaf.org/> .
```

Interoperable

– Représentation des connaissances

– Formalisé

– Accessible

– Partagé

– Applicables à plusieurs contextes

```
dct:hasPart a owl:ObjectProperty .
```

```
sio:000090 rdfs:label "specification"@en .
```

```
<https://w3id.org/fair/principles/terms/FAIR-Vocabulary> a <http://www.w3.org/2002/07/owl#Ontology>;
  <http://purl.org/dc/terms/creator> <https://orcid.org/0000-0002-1267-0234>, <https://orcid.org/0000-0003-4727-9435>;
  <http://purl.org/dc/terms/description> "This is the formal vocabulary (ontology) describing the FAIR principles.";
  <http://purl.org/dc/terms/license> <http://creativecommons.org/licenses/by/4.0/>;
  <http://purl.org/dc/terms/title> "FAIR Vocabulary";
  <http://purl.org/vocab/vann/preferredNamespacePrefix> "fair";
  <http://purl.org/vocab/vann/preferredNamespaceUri> "https://w3id.org/fair/principles/terms/";
  <http://www.w3.org/2000/01/rdf-schema#isDefinedBy> <https://w3id.org/fair/principles/latest/FAIR-Vocabulary>;
  <http://www.w3.org/2000/01/rdf-schema#seeAlso> <https://w3id.org/fair/principles/terms/FAIR>,
  <https://www.dtls.nl/fair-data/fair-principles-explained/> .
```

```
@prefix icc: <https://w3id.org/fair/icc/terms/> .
@prefix fair: <https://w3id.org/fair/principles/terms/> .
@prefix sio: <http://semanticscience.org/resource/> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix owl: <http://www.w3.org/2002/07/owl#> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
@prefix dct: <http://purl.org/dc/terms/> .
@prefix pav: <http://purl.org/pav/> .
@prefix prov: <http://www.w3.org/ns/prov#> .
@prefix np: <http://www.nanopub.org/nschema#> .
@prefix npx: <http://purl.org/nanopub/x/> .
@prefix orcid: <https://orcid.org/> .
@prefix foaf: <http://xmlns.com/foaf/0.1/> .
```

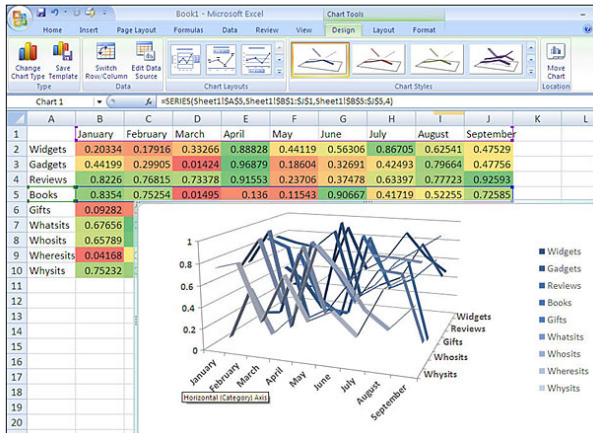
```
dct:hasPart a owl:ObjectProperty .
```

```
sio:000090 rdfs:label "specification"@en .
```

```
<https://w3id.org/fair/principles/terms/FAIR-Vocabulary> a <http://www.w3.org/2002/07/owl#Ontology>;
  <http://purl.org/dc/terms/creator> <https://orcid.org/0000-0002-1267-0234>, <https://orcid.org/0000-0003-4727-9435>;
  <http://purl.org/dc/terms/description> "This is the formal vocabulary (ontology) describing the FAIR principles.";
  <http://purl.org/dc/terms/license> <http://creativecommons.org/licenses/by/4.0/>;
  <http://purl.org/dc/terms/title> "FAIR Vocabulary";
  <http://purl.org/vocab/vann/preferredNamespacePrefix> "fair";
  <http://purl.org/vocab/vann/preferredNamespaceUri> "https://w3id.org/fair/principles/terms/";
  <http://www.w3.org/2000/01/rdf-schema#isDefinedBy> <https://w3id.org/fair/principles/latest/FAIR-Vocabulary>;
  <http://www.w3.org/2000/01/rdf-schema#seeAlso> <https://w3id.org/fair/principles/terms/FAIR>,
  <https://www.dtls.nl/fair-data/fair-principles-explained/> .
```


Interoperable

Microsoft Office 2007 Beta 2



```
@prefix icc: <https://w3id.org/fair/icc/terms/> .
@prefix fair: <https://w3id.org/fair/principles/terms/> .
@prefix sio: <http://semanticscience.org/resource/> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix owl: <http://www.w3.org/2002/07/owl#> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
@prefix dct: <http://purl.org/dc/terms/> .
@prefix pav: <http://purl.org/dc/terms/pav/> .
@prefix prov: <http://www.w3.org/ns/prov#> .
@prefix np: <http://www.numericscience.org/terms/> .
@prefix npx: <http://purl.org/dc/terms/npx/> .
@prefix orcid: <https://orcid.org/> .
@prefix foaf: <http://xmlns.foaf.org/> .
```

Interoperable

- Formats de données ouverts
- Référentiel général d'interopérabilité (France)
- CSV, JSON, XML, formats spécialisés (DICOM en médecine)
- Dites non aux fichiers Excel "Crayola" Junk Charts

```
dct:hasPart a owl:ObjectProperty .
```

```
sio:000090 rdfs:label "specification"@en .
```

```
<https://w3id.org/fair/principles/terms/FAIR-Vocabulary> a <http://www.w3.org/2002/07/owl#Ontology>;
  <http://purl.org/dc/terms/creator> <https://orcid.org/0000-0002-1267-0234>, <https://orcid.org/0000-0003-4727-9435>;
  <http://purl.org/dc/terms/description> "This is the formal vocabulary (ontology) describing the FAIR principles.";
  <http://purl.org/dc/terms/license> <http://creativecommons.org/licenses/by/4.0/>;
  <http://purl.org/dc/terms/title> "FAIR Vocabulary";
  <http://purl.org/vocab/vann/preferredNamespacePrefix> "fair";
  <http://purl.org/vocab/vann/preferredNamespaceUri> "https://w3id.org/fair/principles/terms/";
  <http://www.w3.org/2000/01/rdf-schema#isDefinedBy> <https://w3id.org/fair/principles/latest/FAIR-Vocabulary>;
  <http://www.w3.org/2000/01/rdf-schema#seeAlso> <https://w3id.org/fair/principles/terms/FAIR>,
  <https://www.dtls.nl/fair-data/fair-principles-explained/> .
```

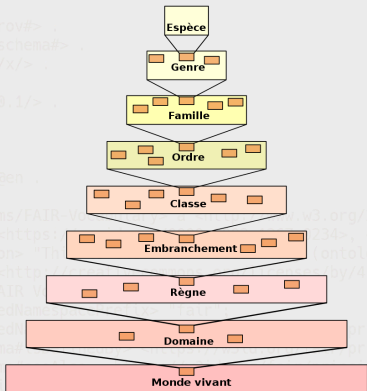
```
@prefix icc: <https://w3id.org/fair/icc/terms/> .
@prefix fair: <https://w3id.org/fair/principles/terms/> .
@prefix sio: <http://semanticscience.org/resource/> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix owl: <http://www.w3.org/2002/07/owl#> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
@prefix dct: <http://purl.org/dc/terms/> .
@prefix pav: <http://purl.org/pav/> .
@prefix prov: <http://www.w3.org/ns/prov#> .
@prefix np: <http://www.nanopub.org/nschema#> .
@prefix npx: <http://purl.org/nanopub/x/> .
@prefix orcid: <https://orcid.org/> .
@prefix foaf: <http://xmlns.com/foaf/0.1/> .
```

```
dct:hasPart a owl:ObjectProperty .
```

```
sio:000090 rdfs:label "specification"@en .
```

```
<https://w3id.org/fair/principles/terms/FAIR-Vocabulary> a <http://www.w3.org/2002/07/owl#Ontology>;
  <http://purl.org/dc/terms/creator> <https://orcid.org/0000-0002-1267-0234>, <https://orcid.org/0000-0003-4727-9435>;
  <http://purl.org/dc/terms/description> "This is the formal vocabulary (ontology) describing the FAIR principles.";
  <http://purl.org/dc/terms/license> <http://creativecommons.org/licenses/by/4.0/>;
  <http://purl.org/dc/terms/title> "FAIR Vocabulary";
  <http://purl.org/vocab/vann/preferredNamespacePrefix> "fair";
  <http://purl.org/vocab/vann/preferredNamespaceUri> "https://w3id.org/fair/principles/terms/";
  <http://www.w3.org/2000/01/rdf-schema#isDefinedBy> <https://w3id.org/fair/principles/latest/FAIR-Vocabulary>;
  <http://www.w3.org/2000/01/rdf-schema#seeAlso> <https://w3id.org/fair/principles/terms/FAIR>,
  <https://www.dtls.nl/fair-data/fair-principles-explained/> .
```

Interoperable



Interoperable

– Vocabulaire

– Taxonomie (vient de la biologie, utilisé dans d'autres sciences)

– Ontologies

– BioPortal

– EU Semantic Interoperability Catalogue

– Logiciel Protégé

– FAIR aussi (récursivité)

– Enjeu souvent rencontré, le papier existe, l'ontologie n'a jamais été publiée 😭

Reusable (réutilisable)

– Description riche

– Pourquoi les données ont été collectées

– Enjeux et limitations des données

– Dates, conditions, personnel, paramètres de collecte

– Données brutes ou traitées

– Expliquer les noms des variables (si pas dans un vocabulaire contrôlé)

– Version

```
@prefix icc: <https://w3id.org/fair/icc/terms/> .
@prefix fair: <https://w3id.org/fair/principles/terms/> .
@prefix sio: <http://semanticscience.org/resource/> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix owl: <http://www.w3.org/2002/07/owl#> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
@prefix dct: <http://purl.org/dc/terms/> .
@prefix pav: <http://purl.org/pav/terms/> .
@prefix prov: <http://www.w3.org/ns/prov#> .
@prefix np: <http://www.w3.org/ns/nschema#> .
@prefix npx: <http://purl.org/net/npx#> .
@prefix orcid: <https://orcid.org/> .
@prefix foaf: <http://xmlns.foaf.org/> .
```

Reusable (réutilisable)

- Licence d'utilisation claire et accessible (interopérabilité légale)
- Source
- Références
- Lignage (qui, quand, comment, avec quoi)
- Code informatique de traitement
- Encodage (ISO-8859-1, UTF-8 ...)

```
<https://w3id.org/fair/principles/terms/FAIR-Vocabulary> a <http://www.w3.org/2002/07/owl#Ontology>;
  <http://purl.org/dc/terms/creator> <https://orcid.org/0000-0002-1267-0234>, <https://orcid.org/0000-0003-4727-9435>;
  <http://purl.org/dc/terms/description> "This is the formal vocabulary (ontology) describing the FAIR principles.";
  <http://purl.org/dc/terms/license> <http://creativecommons.org/licenses/by/4.0/>;
  <http://purl.org/dc/terms/title> "FAIR Vocabulary";
  <http://purl.org/vocab/vann/preferredNamespacePrefix> "fair";
  <http://purl.org/vocab/vann/preferredNamespaceUri> "https://w3id.org/fair/principles/terms/";
  <http://www.w3.org/2000/01/rdf-schema#isDefinedBy> <https://w3id.org/fair/principles/latest/FAIR-Vocabulary>;
  <http://www.w3.org/2000/01/rdf-schema#seeAlso> <https://w3id.org/fair/principles/terms/FAIR>,
  <https://www.dtls.nl/fair-data/fair-principles-explained/> .
```

```
@prefix icc: <https://w3id.org/fair/icc/terms/> .
@prefix fair: <https://w3id.org/fair/principles/terms/> .
@prefix sio: <http://semanticscience.org/resource/> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix owl: <http://www.w3.org/2002/07/owl#> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
@prefix dct: <http://purl.org/dc/terms/> .
@prefix pav: <http://purl.org/pav/terms/> .
@prefix prov: <http://www.w3.org/ns/prov#> .
@prefix np: <http://www.nature.com/terms/> .
@prefix npx: <http://purl.org/net/np/ns#> .
@prefix orcid: <https://orcid.org/> .
@prefix foaf: <http://xmlns.com/foaf/0.1/> .
```

Reusable (réutilisable)

- Normes de pratique du domaine
- Schémas de métadonnées
- Mentionner quel standard suivent les données

```
dct:hasPart a owl:ObjectProperty .
```

```
sio:000090 rdfs:label "specification"@en .
```

```
<https://w3id.org/fair/principles/terms/FAIR-Vocabulary> a <http://www.w3.org/2002/07/owl#Ontology>;
  <http://purl.org/dc/terms/creator> <https://orcid.org/0000-0002-1267-0234>, <https://orcid.org/0000-0003-4727-9435>;
  <http://purl.org/dc/terms/description> "This is the formal vocabulary (ontology) describing the FAIR principles.";
  <http://purl.org/dc/terms/license> <http://creativecommons.org/licenses/by/4.0/>;
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  <http://purl.org/vocab/vann/preferredNamespacePrefix> "fair";
  <http://purl.org/vocab/vann/preferredNamespaceUri> "https://w3id.org/fair/principles/terms/";
  <http://www.w3.org/2000/01/rdf-schema#isDefinedBy> <https://w3id.org/fair/principles/latest/FAIR-Vocabulary>;
  <http://www.w3.org/2000/01/rdf-schema#seeAlso> <https://w3id.org/fair/principles/terms/FAIR>,
  <https://www.dtls.nl/fair-data/fair-principles-explained/> .
```


Pourquoi appliquer les principes FAIR

- Qualité des données
- Revalorisation
- Pérennité
- Méta-analyses
- Cycle de vie
- Transparence

```
<https://w3id.org/fair/principles/terms/FAIR-Vocabulary> a <http://www.w3.org/2002/07/owl#Ontology>;
  <http://purl.org/dc/terms/creator> <https://orcid.org/0000-0002-1267-0234>, <https://orcid.org/0000-0003-4727-9435>;
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  <http://www.w3.org/2000/01/rdf-schema#seeAlso> <https://w3id.org/fair/principles/terms/FAIR>,
  <https://www.dtls.nl/fair-data/fair-principles-explained/> .
```

Qualité des données

- Augmenter la qualité des données de recherche
- Données complètes et intègres
- Sources vérifiables
- Validité (domaines de valeurs)
- Temporalité (cycle de vie, on y revient)

```
@prefix icc: <https://w3id.org/fair/icc/terms/> .
@prefix fair: <https://w3id.org/fair/principles/terms/> .
@prefix sio: <http://semanticscience.org/resource/> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix owl: <http://www.w3.org/2002/07/owl#> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
@prefix dct: <http://purl.org/dc/terms/> .
@prefix pav: <http://purl.org/net/pav/terms/> .
@prefix prov: <http://www.w3.org/ns/prov#> .
@prefix np: <http://www.nanopub.org/nschema#> .
@prefix npx: <http://purl.org/nanopub/x/> .
@prefix orcid: <https://orcid.org/> .
@prefix foaf: <http://xmlns.com/foaf/0.1/> .
```

Revalorisation

— Créer des collections de données de recherche

```
dct:hasPart a owl:ObjectProperty .
```

```
sio:000090 rdfs:label "specification"@en .
```

```
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  <http://purl.org/vocab/vann/preferredNamespaceUri> "https://w3id.org/fair/principles/terms/";
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@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
@prefix dct: <http://purl.org/dc/terms/> .
@prefix pav: <http://purl.org/dc/terms/pav/> .
@prefix prov: <http://www.w3.org/ns/prov/> .
@prefix np: <http://www.w3.org/ns/np/> .
@prefix npx: <http://www.w3.org/ns/npx/> .
@prefix orcid: <https://orcid.org/> .
@prefix foaf: <http://xmlns.com/foaf/0.1/> .
```

Pérennité

- Assurer la pérennité des résultats de recherche et des publications.
- Reproductibilité
- Autonomie dans l'usage de données de recherche

```
dct:hasPart a owl:ObjectProperty .
```

```
sio:000090 rdfs:label "specification"@en .
```

```
<https://w3id.org/fair/principles/terms/FAIR-Vocabulary> a <http://www.w3.org/2002/07/owl#Ontology>;
  <http://purl.org/dc/terms/creator> <https://orcid.org/0000-0002-1267-0234>, <https://orcid.org/0000-0003-4727-9435>;
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  <http://purl.org/dc/terms/title> "FAIR Vocabulary";
  <http://purl.org/vocab/vann/preferredNamespacePrefix> "fair";
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@prefix dct: <http://purl.org/dc/terms/> .
@prefix pav: <http://purl.org/pav/terms/> .
@prefix prov: <http://www.w3.org/ns/prov#> .
@prefix np: <http://www.semanticdesktop.org/ontologies/2007/01/19/ns#> .
@prefix npx: <http://purl.org/net/propertypath/2008/04/property-path#> .
@prefix orcid: <https://orcid.org/> .
@prefix foaf: <http://xmlns.com/foaf/0.1/> .
```

Méta-analyses

- L'interopérabilité permet de faire des méta-analyses sans devoir convertir les données dans d'autres formats ou trouver des équivalences de vocabulaire

```
dct:hasPart a owl:ObjectProperty .
```

```
sio:000090 rdfs:label "specification"@en .
```

```
<https://w3id.org/fair/principles/terms/FAIR-Vocabulary> a <http://www.w3.org/2002/07/owl#Ontology>;
  <http://purl.org/dc/terms/creator> <https://orcid.org/0000-0002-1267-0234>, <https://orcid.org/0000-0003-4727-9435>;
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  <http://www.w3.org/2000/01/rdf-schema#seeAlso> <https://w3id.org/fair/principles/terms/FAIR>,
  <https://www.dtls.nl/fair-data/fair-principles-explained/> .
```

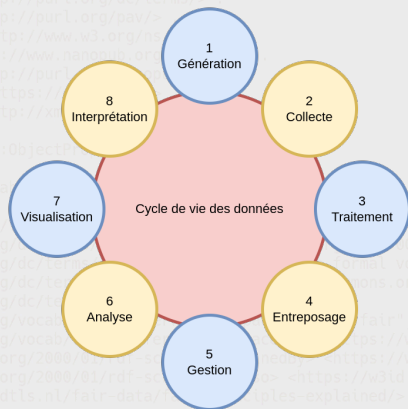
@prefix icc: <https://w3id.org/fair/icc/terms/> .
@prefix fair: <https://w3id.org/fair/principles/terms/> .
@prefix sio: <http://semanticscience.org/resource/> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
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@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
@prefix dct: <http://purl.org/dc/terms/> .
@prefix pav: <http://purl.org/pav/> .
@prefix prov: <http://www.w3.org/ns/prov#> .
@prefix np: <http://www.nanopub.org/nschema#> .
@prefix npx: <http://purl.org/nanopub/x/> .
@prefix orcid: <https://orcid.org/> .
@prefix foaf: <http://xmlns.com/foaf/0.1/> .

dct:hasPart a owl:ObjectProperty .

sio:000090 rdfs:label "specification"@en .

```
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  <http://purl.org/vocab/vann/preferredNamespacePrefix> "fair";  
  <http://purl.org/vocab/vann/preferredNamespaceUri> "https://w3id.org/fair/principles/terms/";  
  <http://www.w3.org/2000/01/rdf-schema#isDefinedBy> <https://w3id.org/fair/principles/latest/FAIR-Vocabulary>;  
  <http://www.w3.org/2000/01/rdf-schema#seeAlso> <https://w3id.org/fair/principles/terms/FAIR>,  
    <https://www.dtls.nl/fair-data/fair-principles-explained/> .
```

Cycle de vie



```
@prefix icc: <https://w3id.org/fair/icc/terms/> .
@prefix fair: <https://w3id.org/fair/principles/terms/> .
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@prefix owl: <http://www.w3.org/2002/07/owl#> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
@prefix dct: <http://purl.org/dc/terms/> .
@prefix pav: <http://purl.org/dc/terms/pav/> .
@prefix prov: <http://www.w3.org/ns/prov/> .
@prefix np: <http://www.w3.org/ns/np/> .
@prefix npx: <http://purl.org/dc/terms/npx/> .
@prefix orcid: <https://orcid.org/> .
@prefix foaf: <http://xmlns.foaf.org/> .
```

Cycle de vie

- Gestion de projet
- Gestion des consentements (gouvernance)
- Facilite l'élaboration de plan de gestion de données
- Facilite la mise à jour des résultats (automatisation)

```
dct:hasPart a owl:ObjectProperty .
```

```
sio:000090 rdfs:label "specification"@en .
```

```
<https://w3id.org/fair/principles/terms/FAIR-Vocabulary> a <http://www.w3.org/2002/07/owl#Ontology>;
  <http://purl.org/dc/terms/creator> <https://orcid.org/0000-0002-1267-0234>, <https://orcid.org/0000-0003-4727-9435>;
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  <http://purl.org/vocab/vann/preferredNamespacePrefix> "fair";
  <http://purl.org/vocab/vann/preferredNamespaceUri> "https://w3id.org/fair/principles/terms/";
  <http://www.w3.org/2000/01/rdf-schema#isDefinedBy> <https://w3id.org/fair/principles/latest/FAIR-Vocabulary>;
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```
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@prefix npx: <http://purl.org/dc/terms/npx/> .
@prefix orcid: <https://orcid.org/> .
@prefix foaf: <http://xmlns.foaf.org/> .
```

Transparence

- Favoriser la reddition de compte et la demande de financement public
- Augmenter la valeur et l'impact à long terme de la recherche
- Réduire les rétractations
- Améliorer l'opinion publique et l'acceptabilité sociale (surtout avec les données médicales, ex : Cancer)

```
dct:hasPart a owl:ObjectProperty .

sio:000090 rdfs:label "specification"@en .

<https://w3id.org/fair/principles/terms/FAIR-Vocabulary> a <http://www.w3.org/2002/07/owl#Ontology>;
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  <http://purl.org/vocab/vann/preferredNamespacePrefix> "fair";
  <http://purl.org/vocab/vann/preferredNamespaceUri> "https://w3id.org/fair/principles/terms/";
  <http://www.w3.org/2000/01/rdf-schema#isDefinedBy> <https://w3id.org/fair/principles/latest/FAIR-Vocabulary>;
  <http://www.w3.org/2000/01/rdf-schema#seeAlso> <https://w3id.org/fair/principles/terms/FAIR>,
  <https://www.dtls.nl/fair-data/fair-principles-explained/> .
```

Références

- Wilkinson, M. D. et al. The FAIR Guiding Principles for scientific data management and stewardship. Sci. Data 3:160018 doi : <https://dx.doi.org/10.1038/sdata.2016.18> (2016).
- Open Knowledge Foundation. Définition du Savoir Libre. Version : 1.1 <https://opendefinition.org/od/1.1/fr/>
- Go FAIR. FAIR Principles <https://www.go-fair.org/fair-principles/>
- OpenAIRE. How to make your data FAIR. <https://www.openaire.eu/how-to-make-your-data-fair>

```
@prefix icc: <https://w3id.org/fair/icc/terms/> .
@prefix fair: <https://w3id.org/fair/principles/terms/> .
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@prefix dct: <http://purl.org/dc/terms/> .
@prefix pav: <http://purl.org/dc/terms/pav/> .
@prefix prov: <http://www.w3.org/ns/prov#> .
@prefix np: <http://www.w3.org/ns/name/> .
@prefix npx: <http://www.w3.org/ns/name-prefix/> .
@prefix orcid: <https://orcid.org/> .
@prefix foaf: <http://xmlns.foaf.org/> .
```

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francois.pelletier.6@ulaval.ca

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```
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```