

LOGIQUE LINKED DATA DE DÉPLOIEMENT DES NOUVELLES API OGC INTEROPERABLES– API4INSPIRE

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Pôle INSIDE

INTEROPÉRABILITÉ DES SYSTÈMES D'INFORMATION SUR L'ENVIRONNEMENT



Géosciences pour une Terre durable

brgm

API4INSPIRE USE CASE

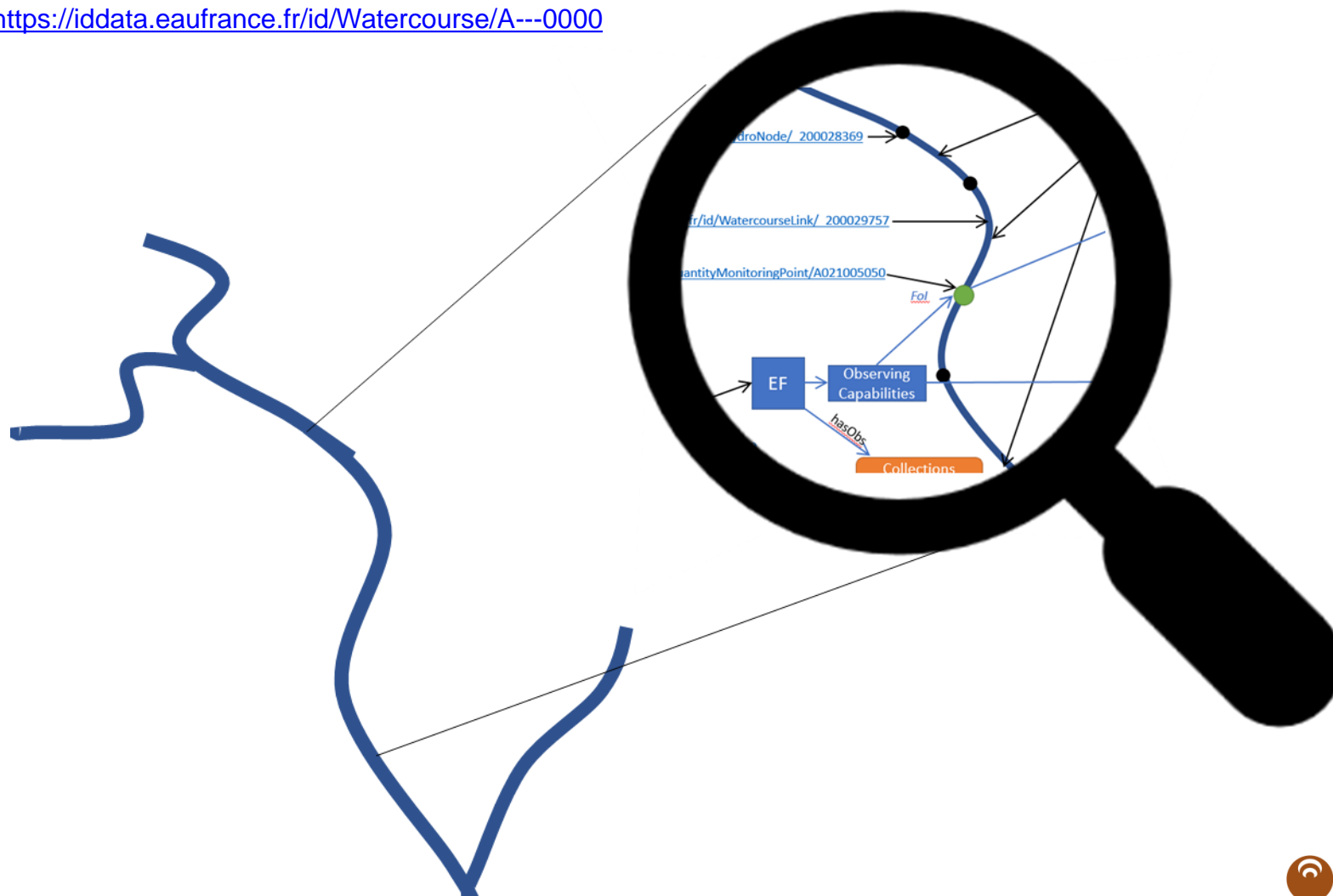
Cross-border avec le Land Allemand du Baden-Württemberg

- Contexte
 - Projet Européen d'appui au JRC pour tester et labelliser les nouvelles API OGC comme services reconnus INSPIRE
- Eau de surface :
 - Stations Qualité / Quantité, leurs observations,
 - et les objets qu'elles suivent (Cours d'eau, ...)
- Eau souterraine
 - Stations quantité, leurs observations,
 - et les entités hydrogéologiques suivies

APPROCHE LINKED DATA

Ex : Le Rhin

<https://iddata.eaufrance.fr/id/Watercourse/A---0000>



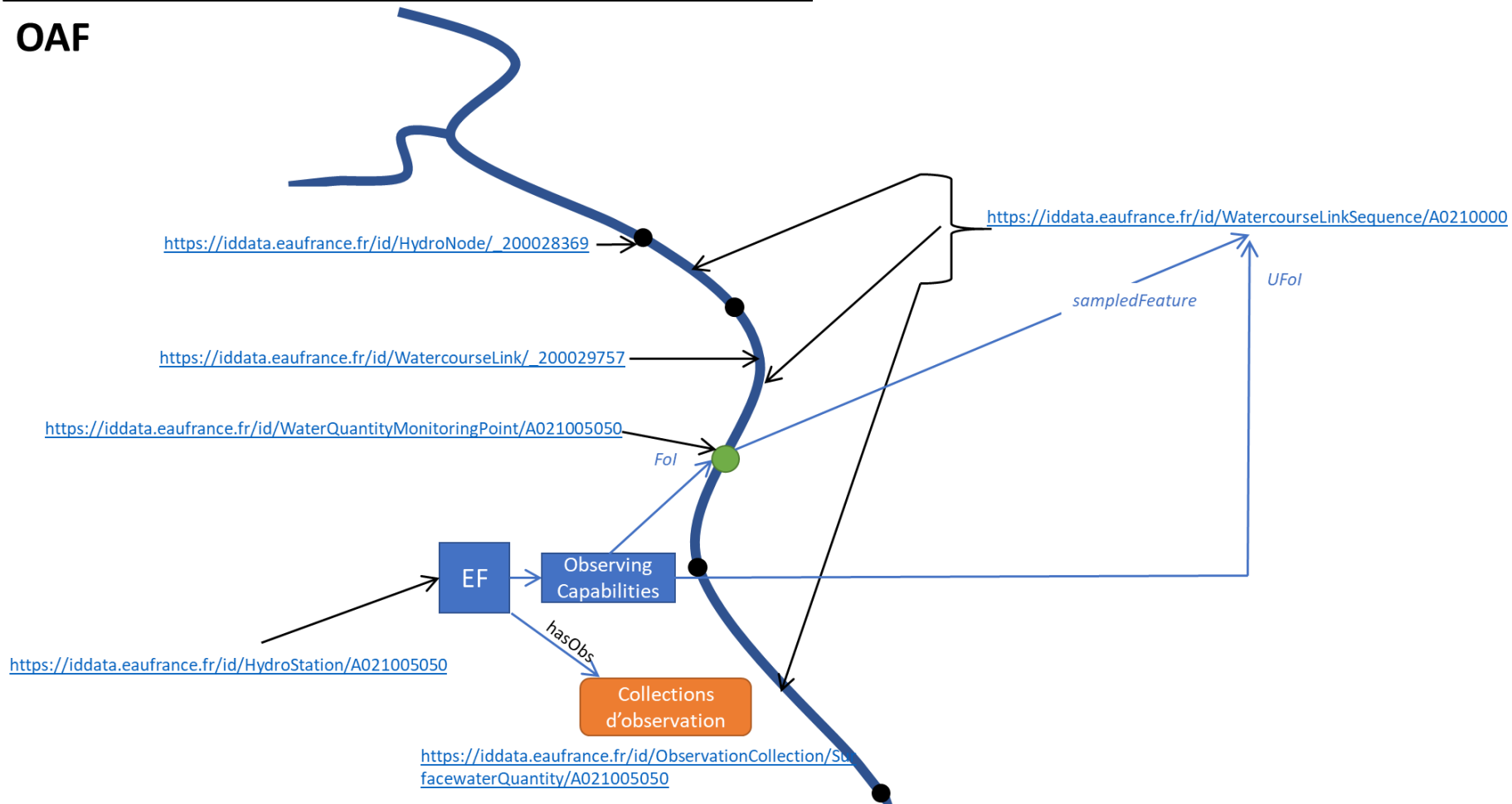
APPROCHE LINKED DATA

Ex : suivi hydrométrique sur le Rhin

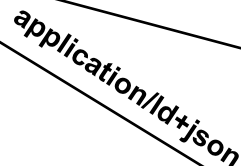
Chaque Feature est identifié par une URI sur laquelle une négociation de contenu est possible

<https://iddata.eaufrance.fr/api/hydroFAP/ogc/features/collections/>

OAF



<https://iddata.eaufrance.fr/id/HydroStation/A021005050>



Etc...

```

    "type": "Feature",
    "id": "401000000",
    "geometry": {
      "type": "Point",
      "coordinates": [
        7.60615316,
        47.50000007
      ]
    },
    "properties": {
      "featureType": "EnvironmentalSensitivity",
      "identifier": "https://data.mfn.gov.ch/hydrocart/401000000",
      "value": "https://data.mfn.gov.ch/hydrocart/401000000",
      "codeSpace": "http://www.ehpf.org/ehpf/ehpf3",
      "ingrater": (w),
      "is also in Swiss (Weinhalde)",
      "mediator": "https://source.ehpf.org/ehpf/ehpf3",
      "id": "https://source.ehpf.org/ehpf/ehpf3",
      "sharability": {
        "sharing": {
          "type": "sharing",
          "from": {
            "type": "interior",
            "ingrater": "101-1-1973-00-000",
            "id": "401000000"
          }
        }
      }
    }
  }
}

```

[illegible]

```

    "context": {
      "sosa": "https://www.w3.org/ns/sosa",
      "schema": "https://schema.org",
      "name": "schema:name",
      "featureCollection": "schema:featureCollection",
      "features": "schema:features",
      "geometry": "schema:geometry",
      "geo": "https://www.opengis.net/ont/geo",
      "isSampleOf": "sosa:isSampleOf",
      "hasObservation": "sosa:hasObservation"
    },
    "type": "featureCollection",
    "features": [
      {
        "id": "https://data.snc.fr/data/fr/identification/0021005450",
        "type": "Feature",
        "features": [
          {
            "sosa:sample": "sosa:Sensor"
          }
        ],
        "name": {
          "language": "fr",
          "value": "Le Rhin en Suisse (Rheinlaufe)"
        },
        "geometry": {
          "type": "Point",
          "alt": "POINT (7.46015115919342 47.35690980701358)",
          "isSampleOf": [
            "https://data.snc.fr/data/fr/interconnection/links/sequence/00210006"
          ]
        }
      }
    ]
  }
}

```

NEGOCIATION DE CONTENU

Exemple concret sur une URI et résultat

- <https://iddata.eaufrance.fr/id/HydroStation/A021005050>
 - Vraie négociation de contenu -> ce que fait votre navigateur web (ex : dans PostMan, cURL)
 - Ou en tant que paramètre dans l'URL :
<https://iddata.eaufrance.fr/id/HydroStation/A021005050?f=application%2Fgeo%2Bjson>
- Exemple dans PostMan

HydroStation GeoJSON Examples (0)

GET

Params Authorization Headers (1) Body Pre-request Script Tests Cookies Code Comments (0)

KEY	VALUE	DESCRIPTION	...	Bulk Edit	Preset
<input checked="" type="checkbox"/> Accept	application/geo+json				
Key	Value	Description			

Body Cookies Headers (8) Test Results Status: 200 OK Time: 54 ms Size: 4.88 KB

Pretty Raw Preview JSON

```
1 {
2   "type": "Feature",
3   "id": "A021005050",
4   "geometry": {
5     "type": "Point",
6     "coordinates": [
7       7.60615316,
8       47.55696987
9     ]
10  },
11  "properties": {
12    "@featureType": "EnvironmentalMonitoringFacility",
```

⇒ Utilisation de la même URI que ce soit pour un humain (IHM) ou une machine

APPROCHE LINKED DATA

Chaque représentation contient des URI vers d'autres objets

```
{
  "type": "Feature",
  "id": "A021005050",
  "geometry": {↔},
  "properties": {
    "@featureType": "EnvironmentalMonitoringFacility",
    "identifier": {
      "value": "https://iddata.eaufrance.fr/id/HydroStation/A021005050",
      "@codespace": "http://www.ictl.org/rtc/rtc2010"
    },
    "inspireId": {↔},
    "name": "Le Rhin en Suisse [Rheinhalle]",
    "mediaMonitored": [↔],
    "observingCapability": [
      {
        "observingTime": {↔},
        "processType": {↔},
        "resultNature": {
          "@href": "https://inspire.ec.europa.eu/codelist/ResultNatureValue/primary"
        },
        "procedure": {↔},
        "featureOfInterest": {↔},
        "ultimateFeatureOfInterest": [
          {
            "@href": "https://iddata.eaufrance.fr/id/WatercourseLinkSequence/A0210000"
          }
        ],
        "observedProperty": {↔}
      }
    ],
    "hasObservation": [
      {
        "@href": "https://iddata.eaufrance.fr/id/ObservationCollection/SurfaceWaterQuantity/A021005050",
        "@title": "A021005050 surfacewater quantity observation collection."
      }
    ]
  }
}
```

URI de la station

URI du tronçon monitoré

APPROCHE LINKED DATA

Exploration graph de données - réseau hydrographique

Station

```
{
  "type": "Feature",
  "id": "A021005050",
  "geometry": {
    "type": "Point",
    "coordinates": [
      4.83, 47.57
    ]
  },
  "properties": {
    "inspireId": {
      "value": "https://iddata.eaufrance.fr/id/HydroStation/A021005050",
      "@codeSpace": "http://www.ietf.org/rfc/rfc2616"
    },
    "name": "Le Rhin en Suisse [Rheinhalle]",
    "mediaMonitored": {
      "value": "https://inspire.ec.europa.eu/codelist/ResultNatureValue/primary"
    },
    "observingCapability": {
      "observingTime": {
        "value": "2017-11-09T23:00:00Z",
        "@codeSpace": "http://www.ietf.org/rfc/rfc2616"
      },
      "processType": {
        "value": "https://inspire.ec.europa.eu/codelist/ResultNatureValue/primary"
      },
      "resultNature": {
        "value": "https://inspire.ec.europa.eu/codelist/ResultNatureValue/primary"
      },
      "procedure": {
        "value": "https://inspire.ec.europa.eu/codelist/ResultNatureValue/primary"
      },
      "ultimateFeatureOfInterest": {
        "value": "https://iddata.eaufrance.fr/id/WatercourseLinkSequence/A02100000"
      },
      "observedProperty": {
        "value": "https://inspire.ec.europa.eu/codelist/ResultNatureValue/primary"
      }
    },
    "hasObservation": [
      {
        "href": "https://iddata.eaufrance.fr/id/ObservationCollection/SurfaceWaterQuantity/A021005050",
        "title": "A021005050 surfacewater quantity observation collection."
      }
    ]
  }
}
```

Tronçon monitoré

```
{
  "type": "Feature",
  "id": "A02100000",
  "geometry": {
    "type": "LineString",
    "coordinates": [
      [
        4.83, 47.57
      ],
      [
        4.83, 47.57
      ]
    ]
  },
  "properties": {
    "@featureType": "WatercourseLinkSequence",
    "metaDataProperty": {
      "value": "https://iddata.eaufrance.fr/id/WatercourseLinkSequence/A02100000",
      "@codeSpace": "https://iddata.eaufrance.fr/id/WatercourseLinkSequence/"
    },
    "inspireId": {
      "value": "https://iddata.eaufrance.fr/id/WatercourseLinkSequence/A02100000",
      "@codeSpace": "https://iddata.eaufrance.fr/id/WatercourseLinkSequence/"
    },
    "beginLifespanVersion": "2020-03-17T20:00:00Z",
    "inNetwork": [
      {
        "href": "https://iddata.eaufrance.fr/id/Watercourse/A---0000",
        "title": "fleuve le rhin"
      }
    ],
    "link": [
      {
        "href": "https://iddata.eaufrance.fr/id/Watercourse/A---0000",
        "title": "fleuve le rhin"
      }
    ]
  }
}
```

Fleuve

```
{
  "type": "Feature",
  "id": "A---0000",
  "geometry": {
    "type": "LineString",
    "coordinates": [
      [
        4.83, 47.57
      ],
      [
        4.83, 47.57
      ]
    ]
  },
  "properties": {
    "@featureType": "Watercourse",
    "metaDataProperty": {
      "value": "https://iddata.eaufrance.fr/id/Watercourse/A---0000",
      "@codeSpace": "http://www.ietf.org/rfc/rfc2616"
    },
    "inspireId": {
      "@dataType": "Identifier",
      "localId": "A---0000",
      "namespace": "https://iddata.eaufrance.fr",
      "versionId": "2017"
    },
    "beginLifespanVersion": "2017-11-09T23:00:00Z",
    "endLifespanVersion": "2019-11-09T23:00:00Z",
    "geographicalName": {
      "@dataType": "geographicalName",
      "GeographicalName": {
        "@dataType": "GeographicalName",
        "language": "FR",
        "value": "fleuve le rhin"
      }
    }
  }
}
```

URI de l'objet

URI vers d'autres objets

APPROCHE LINKED DATA

Exploration graph de données - réseau hydrographique

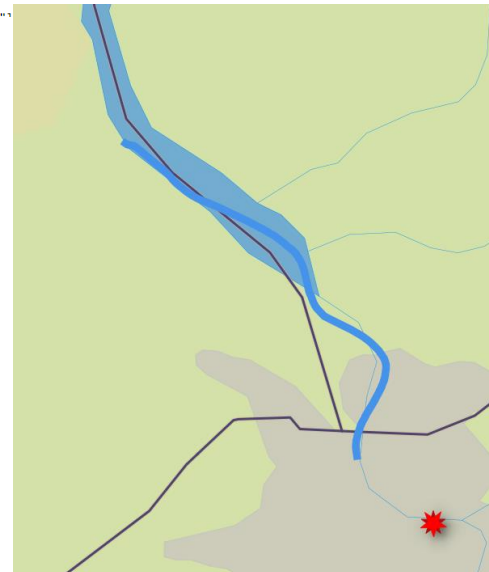
Station

```
{
  "type": "Feature",
  "id": "A021005050",
  "geometry": {
    "type": "Point",
    "coordinates": [
      4.833333,
      47.5
    ]
  },
  "properties": {
    "inspireId": {
      "value": "https://iddata.eaufrance.fr/id/HydroStation/A021005050",
      "@codeSpace": "http://www.ietf.org/rfc/rfc2616"
    },
    "name": "Le Rhin en Suisse [Rheinhalle]",
    "mediaMonitored": {
      "value": "https://inspire.ec.europa.eu/codelist/ResultNatureValue/primary"
    },
    "observingCapability": {
      "observingTime": {
        "value": "2020-03-17T20:00:00Z"
      },
      "processType": {
        "value": "https://inspire.ec.europa.eu/codelist/ResultNatureValue/primary"
      },
      "resultNature": {
        "value": "https://inspire.ec.europa.eu/codelist/ResultNatureValue/primary"
      },
      "procedure": {
        "value": "https://inspire.ec.europa.eu/codelist/ResultNatureValue/primary"
      },
      "ultimateFeatureOfInterest": {
        "value": "https://iddata.eaufrance.fr/id/WatercourseLinkSequence/A02100000"
      },
      "observedProperty": {
        "value": "https://iddata.eaufrance.fr/id/observedProperty/LeRhineInSuisse/A021005050"
      }
    },
    "hasObservation": [
      {
        "value": "https://iddata.eaufrance.fr/id/observedProperty/LeRhineInSuisse/A021005050"
      }
    ]
  }
}
```



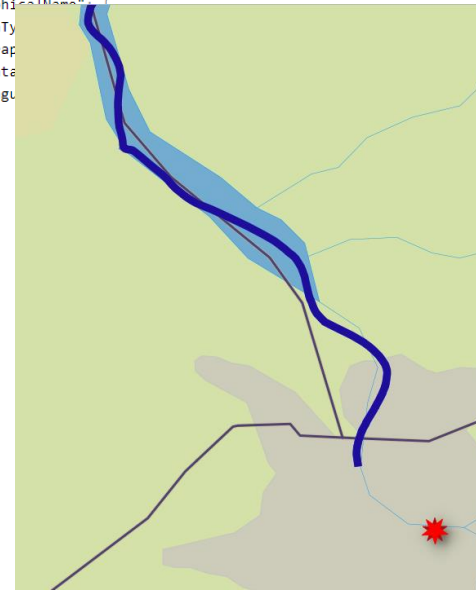
Tronçon monitoré

```
{
  "type": "Feature",
  "id": "A02100000",
  "geometry": {
    "type": "LineString",
    "coordinates": [
      [
        4.833333,
        47.5
      ],
      [
        4.833333,
        47.5
      ]
    ]
  },
  "properties": {
    "@featureType": "WatercourseLinkSequence",
    "metaDataProperty": {
      "value": "https://iddata.eaufrance.fr/id/WatercourseLinkSequence/A02100000",
      "@codeSpace": "https://iddata.eaufrance.fr/id/WatercourseLinkSequence/"
    },
    "inspireId": {
      "value": "https://iddata.eaufrance.fr/id/WatercourseLinkSequence/A02100000",
      "@codeSpace": "https://iddata.eaufrance.fr/id/WatercourseLinkSequence/"
    },
    "beginLifespanVersion": "2020-03-17T20:00:00Z",
    "inNetwork": [
      {
        "@href": "https://iddata.eaufrance.fr/id/Watercourse/A---0000",
        "@title": "fleuve le rhin"
      }
    ],
    "link": [
      {
        "value": "https://iddata.eaufrance.fr/id/Watercourse/A---0000"
      }
    ]
  }
}
```



Fleuve

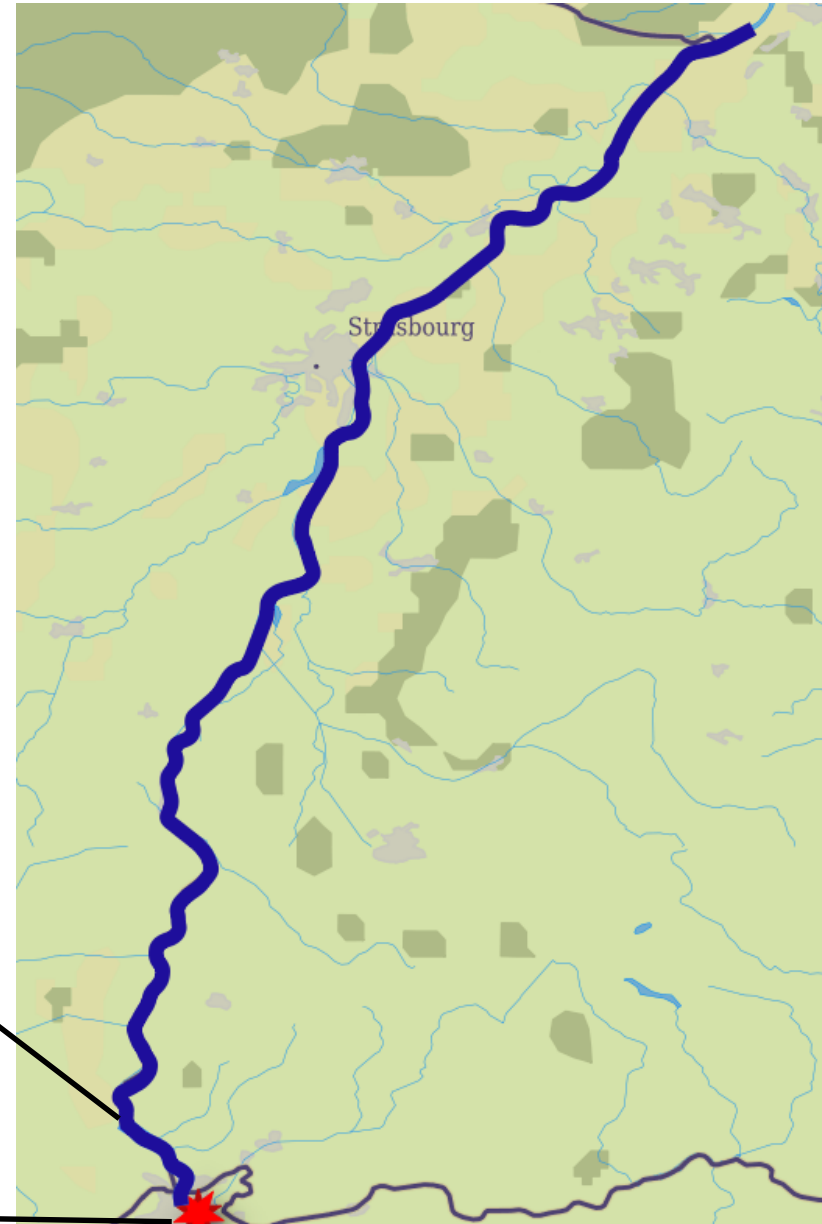
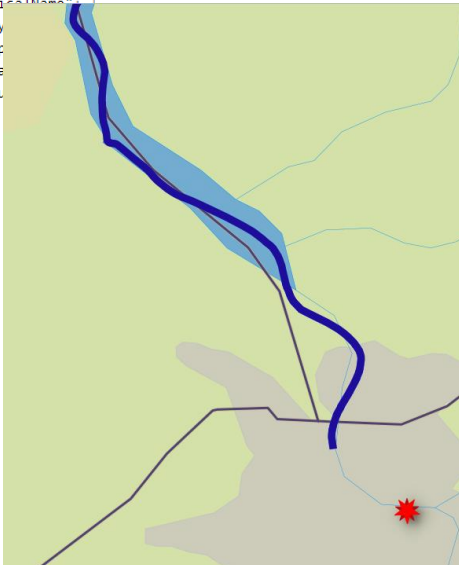
```
{
  "type": "Feature",
  "id": "A---0000",
  "geometry": {
    "type": "LineString",
    "coordinates": [
      [
        4.833333,
        47.5
      ],
      [
        4.833333,
        47.5
      ]
    ]
  },
  "properties": {
    "@featureType": "Watercourse",
    "metaDataProperty": {
      "value": "https://iddata.eaufrance.fr/id/Watercourse/A---0000",
      "@codeSpace": "http://www.ietf.org/rfc/rfc2616"
    },
    "inspireId": {
      "@dataId": "Identifiant",
      "localId": "A---0000",
      "namespace": "https://iddata.eaufrance.fr",
      "versionId": "2017"
    },
    "beginLifespanVersion": "2017-11-09T23:00:00Z",
    "endLifespanVersion": "2019-11-09T23:00:00Z",
    "geographicalName": {
      "@dataId": "Nom",
      "value": "fleuve le rhin",
      "language": "fr"
    }
  }
}
```



APPROCHE LINKED DATA

Fleuve

```
{
  "type": "Feature",
  "id": "A---0000",
  "geometry": {
    "type": "LineString",
    "coordinates": [↔]
  },
  "properties": {
    "@featureType": "Watercourse",
    "value": "https://iddata.eaufrance.fr/id/Watercourse/A---0000",
    "@codeSpace": "http://www.ietf.org/rfc/rfc2616"
  },
  "inspireId": {
    "@dataTy": "Identifier",
    "localId": "A---0000",
    "namespace": "https://iddata.eaufrance.fr",
    "versionId": "2017"
  },
  "beginLifespanVersion": "2017-11-09T23:00:00Z",
  "endLifespanVersion": "2019-11-09T23:00:00Z",
  "geographicalName": {
    "@dataTy": "GeographicalName",
    "@data": "A---0000",
    "lang": "fr"
  }
}
```



APPROCHE LINKED DATA

Chaque représentation contient des URI vers d'autres objets

```
{
  "type": "Feature",
  "id": "A021005050",
  "geometry": {↔},
  "properties": {
    "@featureType": "EnvironmentalMonitoringFacility",
    "identifier": {
      "value": "https://iddata.eaufrance.fr/id/HydroStation/A021005050",
      "@codeSpace": "http://www.ictl.org/rlc/rlc2010"
    },
    "inspireId": {↔},
    "name": "Le Rhin en Suisse [Rheinhalle]",
    "mediaMonitored": [↔],
    "observingCapability": [
      {
        "observingTime": {↔},
        "processType": {↔},
        "resultNature": {
          "@href": "https://inspire.ec.europa.eu/codelist/ResultNatureValue/primary"
        },
        "procedure": {↔},
        "featureOfInterest": {↔},
        "ultimateFeatureOfInterest": [
          {
            "@href": "https://iddata.eaufrance.fr/id/WatercourseLinkSequence/A02100000"
          }
        ],
        "observedProperty": {↔}
      }
    ],
    "hasObservation": [
      {
        "@href": "https://iddata.eaufrance.fr/id/ObservationCollection/SurfaceWaterQuantity/A021005050",
        "@title": "A021005050 surfacewater quantity observation collection."
      }
    ]
  }
}
```

URI de la station

URI de la collection
d'observation

APPROCHE LINKED DATA

Exploration graph de données – observation hydrométrique

Station

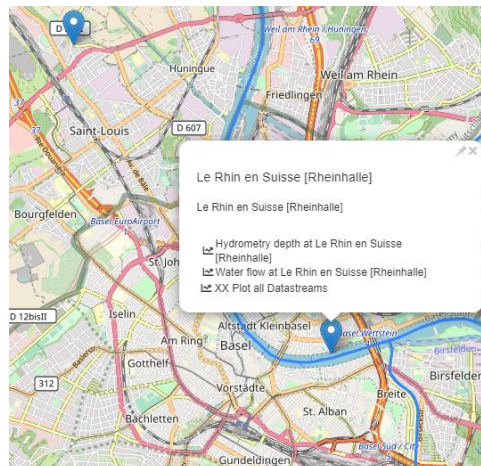
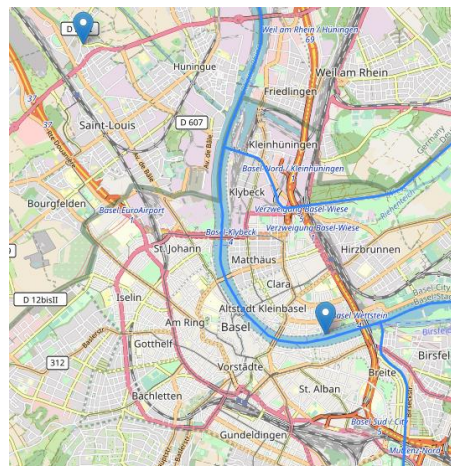
```
{
  "type": "Feature",
  "id": "A021005050",
  "geometry": {},
  "properties": {
    "identifier": {
      "value": "https://ddata.eaufrance.fr/id/HydroStation/A021005050",
      "@codeSpace": "http://www.ietf.org/rfc/rfc2616"
    },
    "inspireId": {},
    "name": "Le Rhin en Suisse [Rheinhalle]",
    "mediaMonitored": {},
    "observingCapability": {
      {
        "observingTime": {},
        "processType": {},
        "resultNature": {
          "@href": "https://inspire.ec.europa.eu/code/list/ResultNatureValue/primary"
        },
        "procedure": {},
        "featureOfInterest": {},
        "ultimateFeatureOfInterest": {
          "@href": "https://ddata.eaufrance.fr/id/Watercourse/sinkSequence/A02100000"
        }
      },
      "observedProperty": {}
    },
    "hasObservation": {
      {
        "@href": "https://ddata.eaufrance.fr/id/ObservationCollection/SurfacewaterQuantity/A021005050",
        "@title": "A021005050 surfacewater quantity observation collection."
      }
    }
  }
}
```

Collections d'observation

```
{
  "value": {
    "name": "Hydrometry depth at Le Rhin en Suisse [Rheinhalle] with method Hydrometry depth measurement by electronic probe",
    "description": "Hydrometry depth at Le Rhin en Suisse [Rheinhalle] with method Hydrometry depth measurement by electronic probe",
    "properties": {
      "relatedTo.FeaturesOfInterest@iot.id": 347
    },
    "observationType": "http://www.opengis.net/def/observationType/OGC-08/2.0/DP_Measurement",
    "observedArea": {
      "type": "Point",
      "coordinates": [
        7.606153158,
        47.556969067
      ]
    },
    "phenomenonTime": "2020-09-10T03:45:00.000Z/2021-01-12T20:00:00.000Z",
    "resultTime": "2020-09-10T03:45:00.000Z/2021-01-12T20:00:00.000Z",
    "result": 6060.0,
    "resultQuality": {
      "value": 6060.0,
      "unit": "mm"
    },
    "thingIot.navigationLink": "https://stahydrometry.brgm-rec.fr/PROST-Server/v1.1/Datastreams(347)/thingIot.navigationLink",
    "ObservationsIot.navigationLink": "https://stahydrometry.brgm-rec.fr/PROST-Server/v1.1/Datastreams(347)/Observations",
    "name": "millimeters",
    "symbol": "mm",
    "definition": "https://data.geoscience.fr/nci/um/691",
    "ObservedProperty@iot.navigationLink": "https://stahydrometry.brgm-rec.fr/PROST-Server/v1.1/Datastreams(347)/ObservedProperty",
    "Iot.selfLink": "https://stahydrometry.brgm-rec.fr/PROST-Server/v1.1/Datastreams(347)",
    "name": "Water flow at Le Rhin en Suisse [Rheinhalle] with method Water flow measurement by electronic probe",
    "description": "Water flow at Le Rhin en Suisse [Rheinhalle] with method Water flow measurement by electronic probe",
    "properties": {
      "relatedTo.FeaturesOfInterest@iot.id": 348
    }
  }
}
```

Une série de données complète

```
"phenomenonTime": "2020-10-06T00:00:00.000Z",
"resultTime": "2020-10-06T00:00:00.000Z",
"result": 6060.0,
"resultQuality": {
  "value": 6060.0,
  "unit": "mm"
},
"DataStreamIot.navigationLink": "https://stahydrometry.brgm-rec.fr/PROST-Server/v1.1/Observations(15878400)/featureOfInterest",
"thingIot.navigationLink": "https://stahydrometry.brgm-rec.fr/PROST-Server/v1.1/Datastreams(347)/thingIot.navigationLink",
"ObservationsIot.navigationLink": "https://stahydrometry.brgm-rec.fr/PROST-Server/v1.1/Datastreams(347)/Observations",
"name": "millimeters",
"symbol": "mm",
"definition": "https://data.geoscience.fr/nci/um/691",
"ObservedProperty@iot.navigationLink": "https://stahydrometry.brgm-rec.fr/PROST-Server/v1.1/Datastreams(347)/ObservedProperty",
"Iot.selfLink": "https://stahydrometry.brgm-rec.fr/PROST-Server/v1.1/Datastreams(347)",
"phenomenonTime": "2020-10-05T23:15:00.000Z",
"resultTime": "2020-10-05T23:15:00.000Z",
"result": 6170.0,
"resultQuality": {
  "value": 6170.0,
  "unit": "mm"
},
"DataStreamIot.navigationLink": "https://stahydrometry.brgm-rec.fr/PROST-Server/v1.1/Observations(15878392)/featureOfInterest",
"thingIot.navigationLink": "https://stahydrometry.brgm-rec.fr/PROST-Server/v1.1/Datastreams(347)/thingIot.navigationLink",
"ObservationsIot.navigationLink": "https://stahydrometry.brgm-rec.fr/PROST-Server/v1.1/Datastreams(347)/Observations",
"name": "millimeters",
"symbol": "mm",
"definition": "https://data.geoscience.fr/nci/um/691",
"ObservedProperty@iot.navigationLink": "https://stahydrometry.brgm-rec.fr/PROST-Server/v1.1/Datastreams(347)/ObservedProperty",
"Iot.selfLink": "https://stahydrometry.brgm-rec.fr/PROST-Server/v1.1/Datastreams(347)",
"phenomenonTime": "2020-10-05T23:30:00.000Z",
"resultTime": "2020-10-05T23:30:00.000Z",
"result": 6100.0,
"resultQuality": {
  "value": 6100.0,
  "unit": "mm"
}
```



MERCI

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