

Nutzung von OGC API Features und OGC SensorThings API zur INSPIRE-konformen Bereitstellung von Umweltdaten

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con•terra

The logo for the German Federal Environment Agency (Umwelt Bundesamt), consisting of the text "Umwelt Bundesamt" in white sans-serif font on a green rectangular background, with a small green circular icon containing a white stylized figure to the right of the text.

Ausgangssituation

- Große Bedeutung um aktuellen Problemen zu begegnen
 - _ Green Deal → Relevanz von Umwelt- und Geodaten wird hervorgehoben
 - _ Europäische Strategie für Daten
 - _ Neufassung der Open Data Direktive
- Beispiel: Sensormessungen wie Daten über Schadstoffkonzentrationen
- INSPIRE Direktive und zugehörige Technical Guidance-Dokumente sollen Zugriff auf Daten vereinfachen

AQD e-Reporting

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DATA

Air Quality e-Reporting (AQ e-Reporting)

European air quality information reported by EEA member countries, including all EU Member States, as well as EEA cooperating and other reporting countries. The EEA's air quality database consists of a multi-annual time series of air quality measurement data and calculated statistics for a number of air pollutants. It also contains meta-information on the monitoring networks involved, their stations and measurements, air quality modelling techniques, as well as air quality zones, assessment regimes, compliance attainments and air quality plans and programmes reported by the EU Member States and European Economic Area countries.

Prod-ID: DAT-3-en Created 16 Aug 2021 — Published 30 Sep 2021 — Last modified 27 Apr 2022 — 27 min read

 [Assessment methods meta-data reported by countries \(data flow D\)](#)

Data and maps

- Global search
- Dashboards
- Datasets
- Interactive data viewers
- External datasets catalogue
- Air Quality e-Reporting (AQ e-Reporting)**
- Assessment methods meta-data reported by countries (data flow D)
- Air quality annual statistics

Quelle: <https://www.eea.europa.eu/data-and-maps/data/aqereporting-9>

AQD e-Reporting

- Mehrere Datenströme
- In diesem Vortrag:
 - _ Datenstrom D
 - > Stationsdaten
 - _ Datenstrom E1a/E2a
 - > Luftqualitätsmessdaten (Zeitreihen)

Zielsetzung

- Bisherige Lösungsansätze
 - _ OGC Sensor Observation Service und ISO/OGC Observations and Measurements
 - _ OGC Web Feature Service
- Neue Generation von OGC-Standards bietet höheres Maß an Entwicklerfreundlichkeit → Nutzung/Nutzbarkeit der Daten erhöhen
 - _ REST
 - _ JSON
- Bessere Auffindbarkeit in Suchmaschinen

OGC API

- Features
- EDR
- Processes
- In Entwicklung:
 - Maps
 - Records
 - Coverages
 - ...

The screenshot shows the OGC API website. At the top is the Open Geospatial Consortium logo and a navigation menu with links for CONTEXT, APIS, SPRINTS, VIDEOS, BLOGS, DOCUMENTS, and GET IN TOUCH. The main content area is titled 'APIS' and features three columns, each representing an OGC API standard. Each column includes a representative image, the standard name, a checkmark indicating it is an 'Approved Standard', and a brief description.

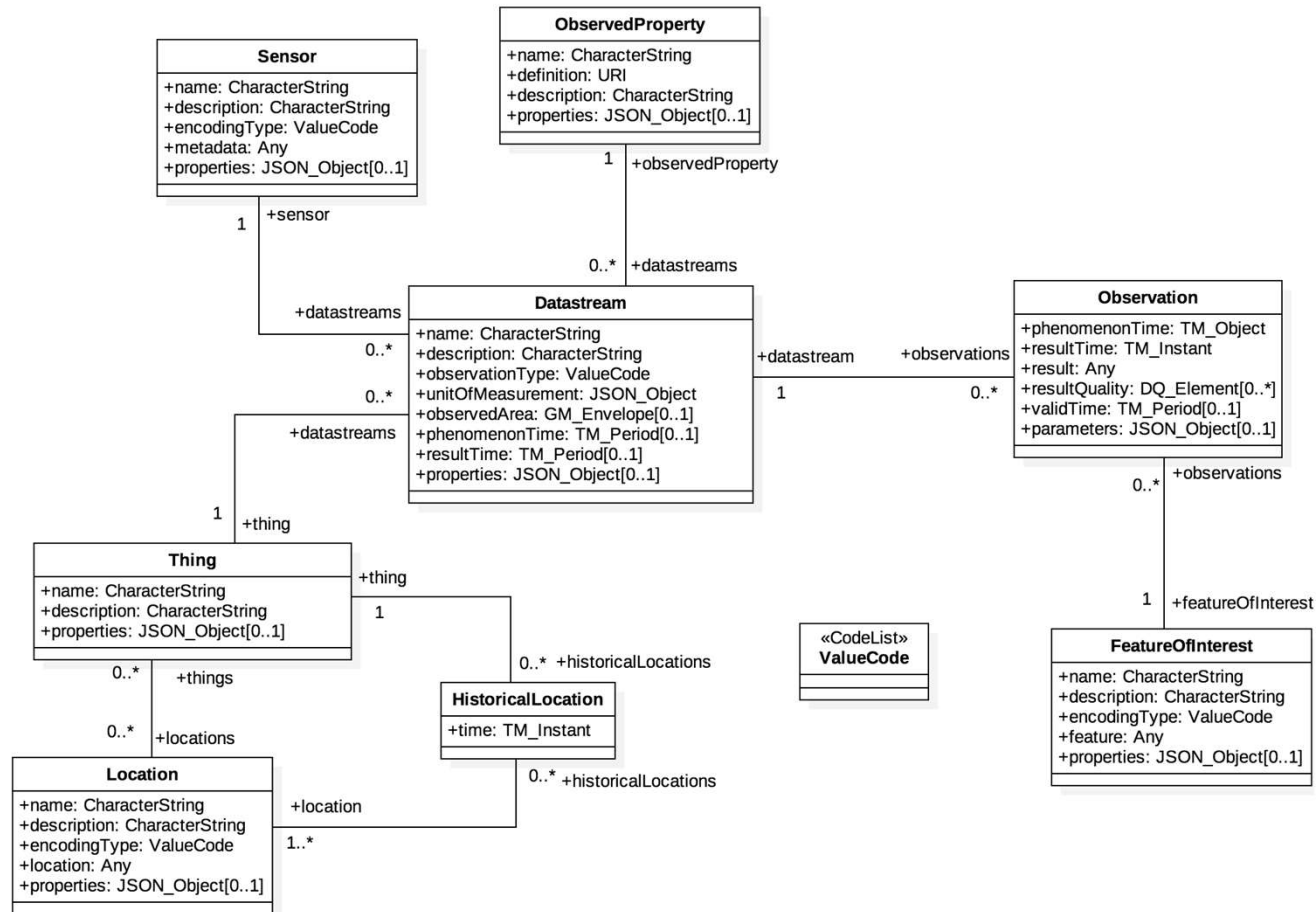
Standard Name	Status	Description
Features	Approved Standard	OGC API - Features - Part 1: Core and Part 2: Coordinate Reference Systems by Reference are both publicly available.
Common	Approved Standard	OGC API - Common provides those elements shared by most or all of the OGC API standards to ensure consistency across the family. The candidate standard will soon be released for public review.
EDR	Approved Standard	Environmental Data Retrieval (EDR) API provides a family of lightweight interfaces to access Environmental Data resources. Each resource addressed by an EDR API maps to a defined query pattern.

Quelle: <https://ogcapi.ogc.org/>

SensorThings API

- Seit 2018 als OGC-Standard verfügbar
- Zugriff auf Datenströme von Sensoren
- Basiert auf REST und JSON
- Im Gegensatz zur OGC API
 - _ ODATA-basiert anstelle von OpenAPI
- Erfährt aktuell hohe Akzeptanz in der Community

SensorThings API



Quelle:
<https://docs.ogc.org/is/18-088/18-088.html#fig-sensing-entities>

SensorThings API

The screenshot shows the INSPIRE Knowledge Base website. At the top, there is a navigation bar with the European Commission logo and the text "INSPIRE KNOWLEDGE BASE Infrastructure for spatial information in Europe". A search bar is located on the right. Below the navigation bar, there is a menu with options: Home, Learn, Implement, Participate, Use, and Toolkit. The "Implement" option is selected. On the left, there is a "Quick search" sidebar with a list of categories. The main content area is titled "Good Practice Library" and contains two columns: "Candidate" and "Endorsed". The "Endorsed" column lists several documents, with two of them highlighted by a red box: "OGC API - Features as an INSPIRE download service" and "OGC SensorThings API as an INSPIRE download service".

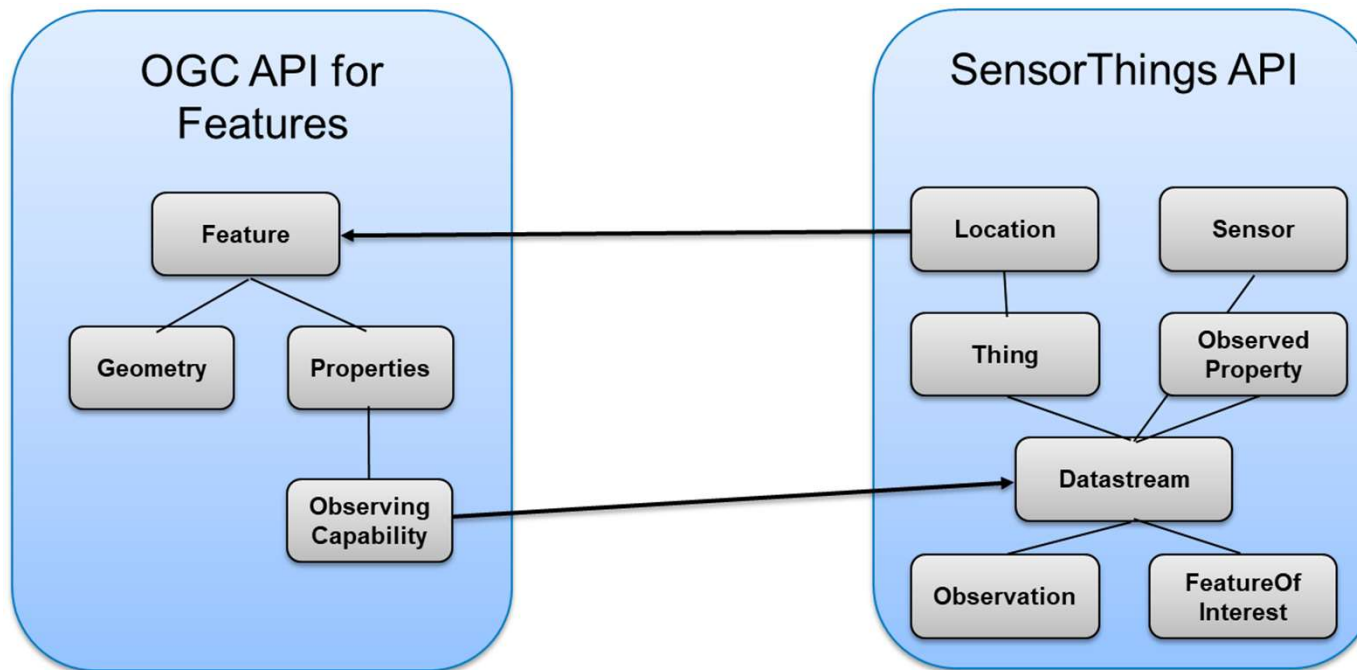
Quelle: <https://inspire.ec.europa.eu/portfolio/good-practice-library>

Verknüpfung von OGC API: Features und SensorThings API

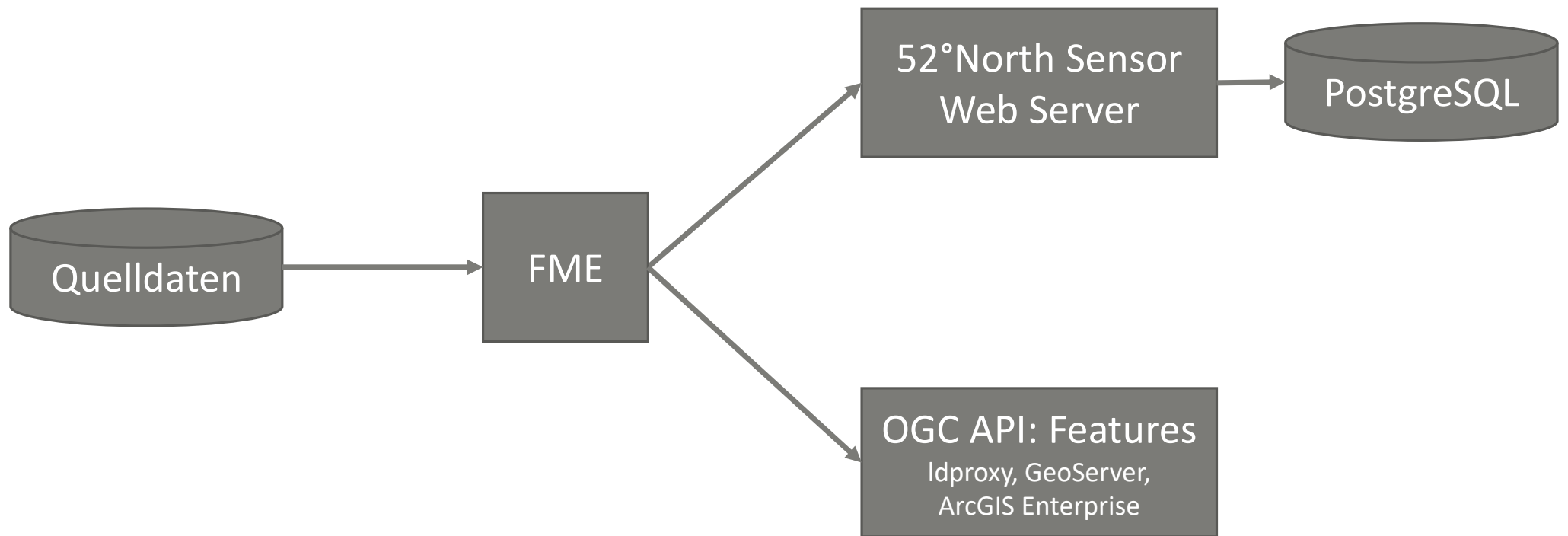
- SensorThings API vereinfacht Auslieferung von Messdaten
- OGC API: Features erlaubt die effiziente Bereitstellung von Vektordaten
 - _ Beispiel: Standorte von Messstationen
 - _ Bereits nutzbar: GeoJSON Encoding Rule for INSPIRE Environmental Monitoring Facilities [1]
- Idee: Verlinkung
 - _ Welche Messdaten sind an einer Station verfügbar?
 - _ Welche Station hat einen bestimmten Satz an Messdaten geliefert?

[1] <https://github.com/INSPIRE-MIF/2017.2/blob/master/GeoJSON/efs/simple-environmental-monitoring-facilities.md>

Verknüpfung von OGC API: Features und SensorThings API



Umsetzung



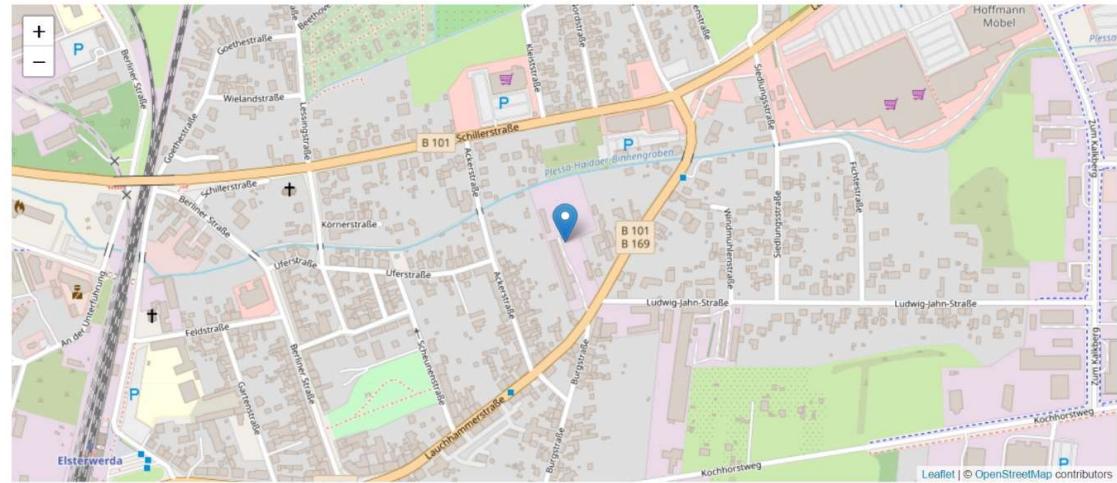
Verknüpfung von OGC API: Features und SensorThings API

Beispiel:
Location
aus STA

```
{
  "@iot.count": 1,
  "value": [
    {
      "@iot.id": "STA.DE_DENW245",
      "@iot.selfLink": "https://sfsdiextern.conterra.de/52n-sensorthings-webapp/Locations(STA.DE_DENW245)",
      "name": "Stolberg Heinrich-Böll-Platz",
      "description": "DENW245",
      "encodingType": "application/vnd.geo+json",
      "location": {
        "type": "Point",
        "coordinates": [
          6.232592,
          50.764819
        ],
        "crs": {
          "type": "name",
          "properties": {
            "name": "EPSG:4326"
          }
        }
      },
      "properties": {
        "emf": "https://sfsdiextern.conterra.de/ldproxy/rest/services/aqd_stations_v2/collections/stations/items?inspireId_localId=STA.DE_DENW245"
      },
      "Things@iot.navigationLink": "https://sfsdiextern.conterra.de/52n-sensorthings-webapp/Locations(STA.DE_DENW245)/Things",
      "HistoricalLocations@iot.navigationLink": "https://sfsdiextern.conterra.de/52n-sensorthings-webapp/Locations(STA.DE_DENW245)/HistoricalLocations"
    }
  ]
}
```

Umsetzung

- HTML-Output der OGC API: Features



Elsterwerda

id	1
Local identifier	STA.DE_DEBB007
Namespace	http://gdi.uba.de/arcgis/rest/services/inspire/DE.UBA.AQD
Version ID	final_2019_v1
observingCapability	https://ufz.demo.52north.org/awi/sta/v1.1/Datastreams?filter=Observations/FeatureOfInterest/id eq ...
GML ID	STA.DE_DEBB007
AbstractMonitoringObject name	Elsterwerda
Mobile indicator	Nein
operationalActivityPeriod_beginPosition	1992-09-01 00:00:01
National station code	DEBB007
Municipality	Elsterwerda
EU station code	DEBB007
Station info	http://www.env-it.de/stationen/public/open.do
Altitude	89
uom	m

Nächste Schritte

- Aktuell Evaluierung weiterer Umsetzungsmöglichkeiten
 - _ GeoServer
 - _ ArcGIS Enterprise
- Automatisierung der Data Loading-Prozesse
 - _ FME
- Dokumentation des entwickelten Ansatzes
 - _ Ziel: INSPIRE Good Practice
- Zukünftig interessant: SensorThings API 2.0

Zusammenfassung

- OGC API und SensorThings API erlauben die effiziente Bereitstellung von Messdaten und Stationsgeometrien
- Verknüpfung beider APIs erhöht die Nutzbarkeit der Daten
 - _ Direkte Beziehungen, welche von Client-Anwendungen genutzt werden können
- Umsetzung effizient möglich:
 - _ 52°North SensorThings API-Implementierung
 - _ OGC API: Features z.B. via Idproxy, GeoServer, ArcGIS Enterprise
- INSPIRE Good Practice als möglicher nächster Schritt

Vielen Dank für die Aufmerksamkeit!

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