OGC API Features

GEOLOGICAL SURVEY OF NORWAY

- NGU -

MAKE QUERYABLE MAPS WITH OGS API Features

Filtering, navigation structures, symbolization & complex data

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ICA preconference workshop on OGC API Standards

ICA Commission on SDI and Standards, Cape Town, 11. August 2023

Contents

What is Ldproxy?

- **Ldproxy - an OGC API implementation**
  - Provides access to data via REST APIs
  - Search (filtering)
  - Map display
  - HTML templates – brand your website
- **Docker based – easy to upgrade**
- **Reference implementation for**
  - OGC API - Features - Part 1: Core
  - OGC API - Features - Part 2: Coordinate systems
- **Data sources:** PostGIS, WFS & GeoPackage
- **Output:** HTML, GeoJSON, GML, JSON-FG, CSV, …

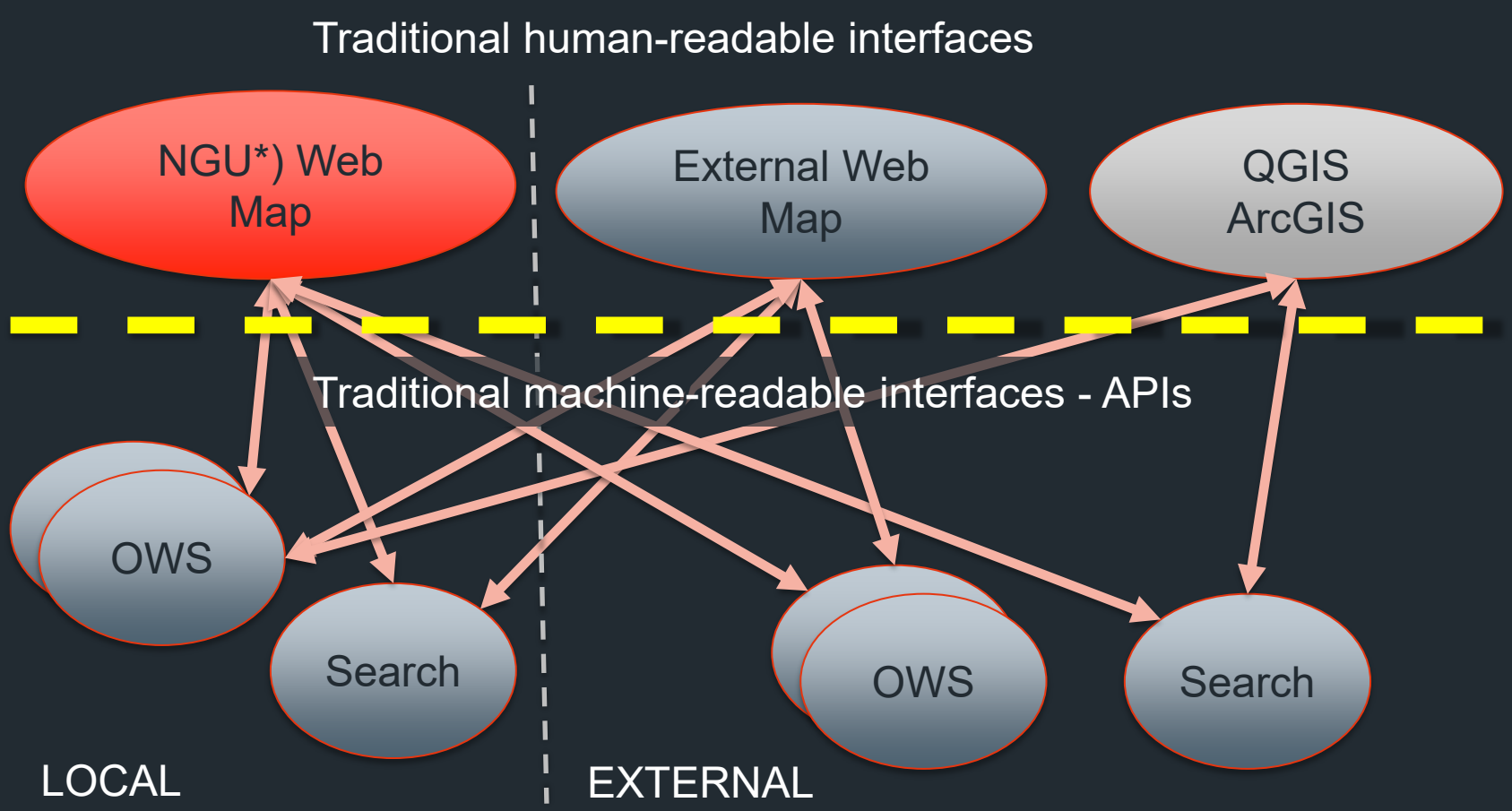
What is Ldproxy? - continued

- **Other standards used (including drafts)**
  - OGC API - Features - Part 3: Filtering, draft
  - OGC API - Features - Part 4: Create, Replace, Update and Delete, draft
  - OGC API - Tiles - Part 1: Core, Version 1.0.0
  - OGC API - Styles, draft
  - OGC API - Routes - Part 1: Core, draft
  - OGC API - 3D GeoVolumes, draft
  - Common Query Language (CQL2), draft

When we are using one standard, several other standards come into play

Human vs machine interfaces - Traditional

SERVICES



*) Geological Survey of Norway

GEOLOGICAL SURVEY OF NORWAY - NGU -

In OGC API Features you can switch between a human-readable and a machine-readable interface

Filtering – collections & items

- **/collections/{name}/items/{featureId}**
- **f(format), limit, bbox, datetime (temporal)**
- **Filter (query):**
  - cql2-text (SQL)
  - cql2-json (SQL formatted in JSON)
  - geometry (SQL spatial query)

Filtering in HTML

GRAVEL & HARD ROCK AGGREGATE

Grusområde

Sand- og grusområde

Filter Apply Cancel

raastoffbetydning=Nasjonal betydning ×

bbox=10.1108,60.1700,10.4284,60.2625 ×

FIELD

none

filter pattern

Add

Use * as wildcard

BBOX

10.1108 60.1700

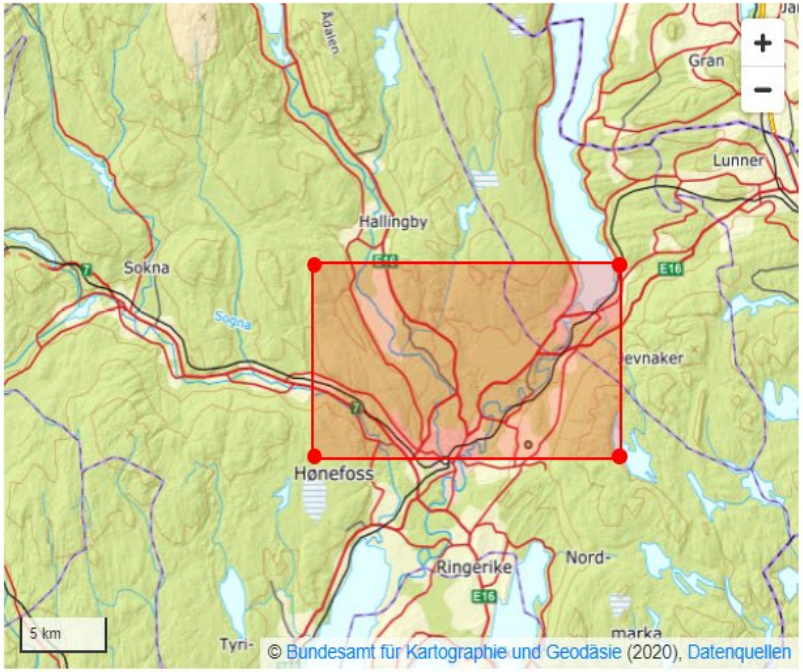
10.4284 60.2625 Add

DATE/TIME

Period Instant

19.10.1978 00:00:00

31.03.2022 00:00:00 Add

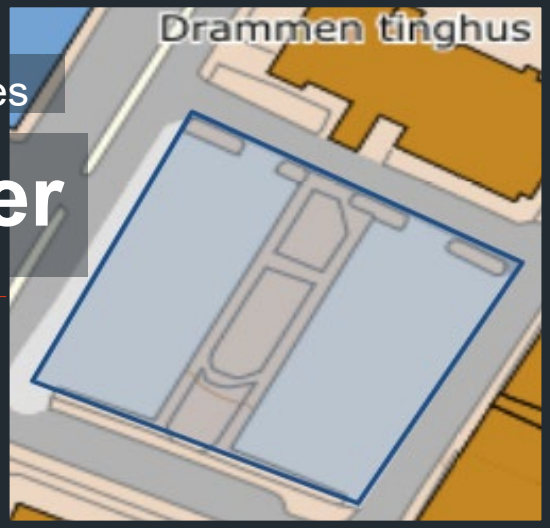


Filtering: Result in HTML or JSON

GRAVEL & HARD ROCK AGGREGATE


```
{
    type: "FeatureCollection",
    numberReturned: 3,
    numberMatched: 3,
    timeStamp: "2022-11-17T19:02:48Z",
  - features: [
      - {
            type: "Feature",
            id: "46040",
          - geometry: {
                type: "Polygon",
              + coordinates: [1],
            },
          - properties: {
                omr_navn: "Eggemoen",
                objekttype: "SandGrusOmr",
                omr_nasj_viktig: "n",
                omr_materiale: "Sand og grus",
                raastoffbetydning: "Nasjonal betydning",
                raastoffbetydning_text: "Klassifikasjon pe
                sist_oppdatert: "2015-11-23",
                beskrivelse: "Eggemoen er den største sand
                4 meter i sør.  Bergarts- og mineralinnhol
                fylkesnummer: "30",
                kommunenummer: "3007,3053",
              - arealbruk: [
                  - {
                        formaal: "Bebygd",
                        prosentverdi: "20",
                    },
                  - {
                        formaal: "Skog",
                        prosentverdi: "80",
                    },
                ],
```

Filtering – simple geometry filter

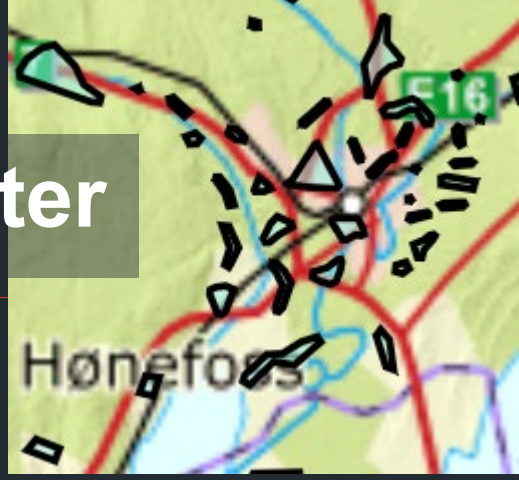


- **Simple polygon:**

  ?filter-lang=cql2-text&**filter**=

  S_INTERSECTS(geometry,**POLYGON**((10.2114794 59.7433498,10.2119924 59.7437925,10.2119212 59.7438104,10.2109614 59.7440697,10.2104627 59.7435746,10.2114794 59.7433498)))

Filtering – complex geometry filter



- **Complekst polygon:**

?filter-lang=cql2-text&filter=

S_INTERSECTS(geometry,MULTIPOLYGON(((10.2143459 60.0796122,10.2043308 60.0780587,10.1800784 60.0810428,10.1821144 60.0899231,10.1940729 60.0994027,10.2183478 60.0996295,10.2189974
60.0967971,10.2143459 60.0796122)),((10.1056064 60.0756842,10.0824724 60.0679218,10.0784859 60.0722955,10.0949031 60.077191,10.0942802 60.0909726,10.1078651 60.0957609,10.111746 60.0856702,10.106008
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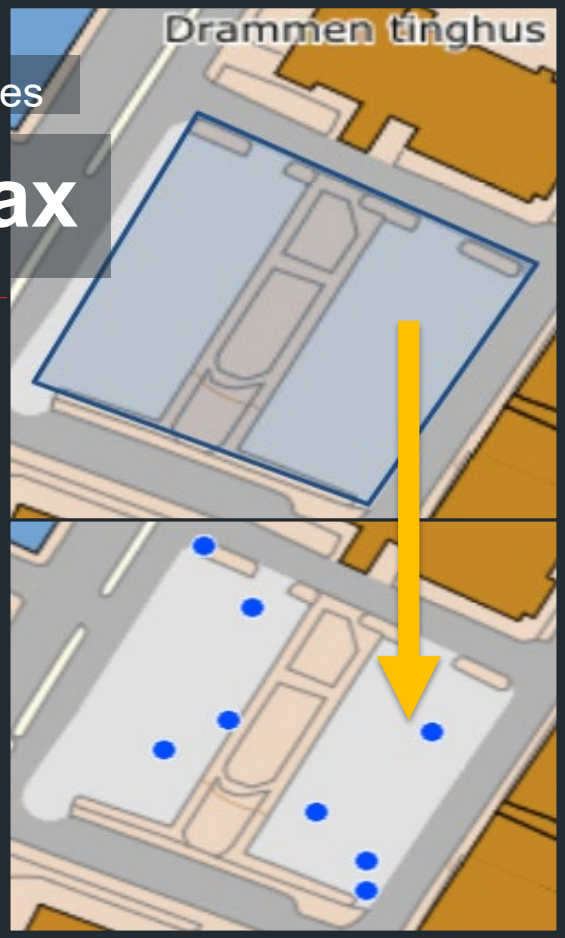
59.9879887))))

Filtering – geometry filter syntax



- **Does not allow complex polygon due to http GET**
- **Standard: {serviceUrl}/…/items?filter={**

  S_INTERSECTS(geometry, **{polygon})**

  }
- **Possible extension?: {serviceUrl1}/…/items?filter={**

  S_INTERSECTS(geometry, **{serviceUrl2}/…/items/{id})**

  }

Navigation structure – Ldproxy

- **Services -> Service -> Data**

MARIN

Home / Marine bunnsedimenter kornstørrelse / Data JSON

Marine bunnsedimenter kornstørrelse

Datasettene viser bunnsedimenter i de øverste lag av havbunnen, klassifisert etter jordartstype. Jordart som egenskap beskriver løsmas dannelsesmåte. Dataene dekker deler av Norsk kontinentalsokkel i Norskehavet, Nordsjøen og i Skagerrak. Datagrunnlaget for dette tema e kvartærgeologiske kart (løsmassekart) som foreligger analogt, og/eller digitale data fra moderne kartlegging. Dataene er digitalisert med tanke på presentasjon i målestokk 1:750.000 (oversiktskart).

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Data

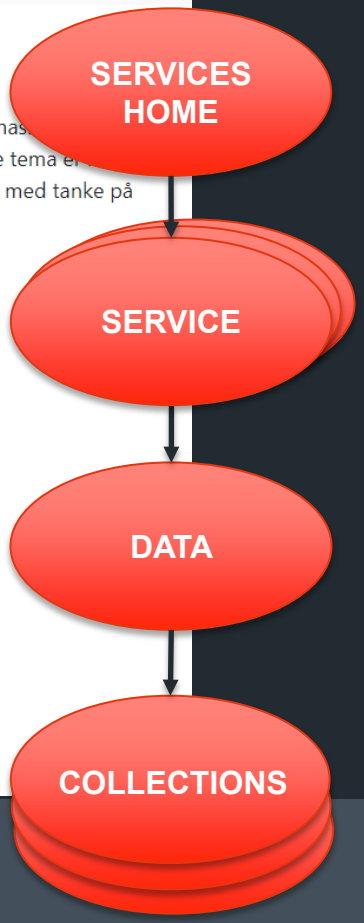
1) Bunnsediment kornstorrelse oversikt (1:1 000 000) — more information
Datasettet viser kornstørrelsessammensetning i sjøbunnsedimentenes øvre del (øverst 0-50cm av sjøbunnen).

2) Bunnsediment kornstorrelse regional (1:100 000 - 1:250 000) — more information
Datasettet viser kornstørrelsessammensetning i sjøbunnsedimentenes øvre del (øverst 0-50cm av sjøbunnen).

3) Bunnsediment kornstorrelse detaljert (1:25.000) — more information
Datasettet viser kornstørrelsessammensetning i sjøbunnsedimentenes øvre del (øverst 0-50cm av sjøbunnen.

Data license NLOD 2.0 (Compabible with CC-BY-4.0)

Data download
Produktark - Bunnsedimenter (kornstørrelse), oversikt 1:750.000
Produktspesifikasjon - Bunnsedimenter kornstørrelse
Download the data in misc formats in custom areas (Provider: Norges geologiske undersøkelse)



Navigation structure – Ldproxy

- **Services -> Service -> Data -> Collection**

MARIN

Home / Marine bunnsedimenter kornstørrelse / Data / 1) Bunnsediment kornstorrelse oversikt (1:1 000 000) / Items

GeoJSON

1) Bunnsediment kornstorrelse oversikt (

Datasettet viser kornstørrelsessammensetning i sjøbunnsedimentenes øvre del (øverst 0-50cm av sjøbu

Filter Edit

« ‹ 1 › »

0ab7f00c-3adf-4225-ad6e-305a1ec508a3

Bunnsedimentkornstorrelseove...	0ab7f00c-3adf-4225-ad6e-305a1ec508a3
Navnerom	https://data.geonorge.no/sosi/ge...
Versjonid	1.1
Sediment kornstorrelse	120
Sediment kornstorrelsenavn	Grusholdig slamholdig sand

0cb059bd-2859-4ddf-b591-933cd57705d9


```
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    type: "FeatureCollection",
    numberReturned: 15,
    numberMatched: 15,
    timeStamp: "2022-11-18T08:2[illegible]53Z",
  - features: [
      - {
            type: "Feature",
            id: "0ab7f00c-3adf-4225-ad6e-30[illegible]
          + geometry: {2},
          - properties: {
                navnerom: "https://data.geo[illegible]
                versjonid: "1.1",
                sedkornstorrelse: "120",
                sedkornstorrelsenavn: "Grus[illegible]
            },
        },
      - {
            type: "Feature",
            id: "0cb059bd-2859-4ddf-b591-93[illegible]
          + geometry: {2},
          - properties: {
                navnerom: "https://data.geo[illegible]
```

Navigation structure – linked data I

NADAG *)

Geotechnical Survey

1:M

Geotechnical Borehole

1:M

Geotechnical Borehole Survey

HTML

Lokal ID

15f4f2b0-e29-40cb-a57b-eec707a64c

Beskrivelse

Digitaliseringmetode: Kart Kommentar:
grunnundersøkelse. NB! Gnr og Brnr gj
Flere kart. Merknad: 23.01.2014 - Endre
Datakvalitet: God

Geoteknisk borehull

http://l2001-ivesve.ngu.no:7080/rest/services/nadag/collections/geote...

Geoteknisk profil URL

http://l2001-ivesve.ngu.no:7080/rest/services/nadag/collections/geote...

Geoteknisk rapport URL

http://l2001-ivesve.ngu.no:7080/rest/services/nadag/collections/geote...

Faktaark URL

https://geo.ngu.no/api/faktaark/nadag/visGeotekniskUndersokelse.ph...

*) National Database for Ground investigations

Navigation structure – linked data II

NADAG *)

Geotechnical Survey

1:M

Geotechnical Borehole

1:M

Geotechnical Borehole Survey

HTML

Lokal ID	
Borenr	
Beskrivelse	
Kvikkleirepåvisning	
Geoteknisk undersøkelse ID	
Geoteknisk undersøkelse URL	http://l2001-ivesve
Geotekinsk borehullundersøkelse URL	http://l2001-ivesve
Geoteknisk profil URL	http://l2001-ivesve.
Geoteknisk rapport URL	http://l2001-ivesve.
Faktaark URL	https://geo.ngu.no/

*) National Database for Ground investigations

Navigation structure – linked data III

HTML

NADAG *)

Geotechnical Survey

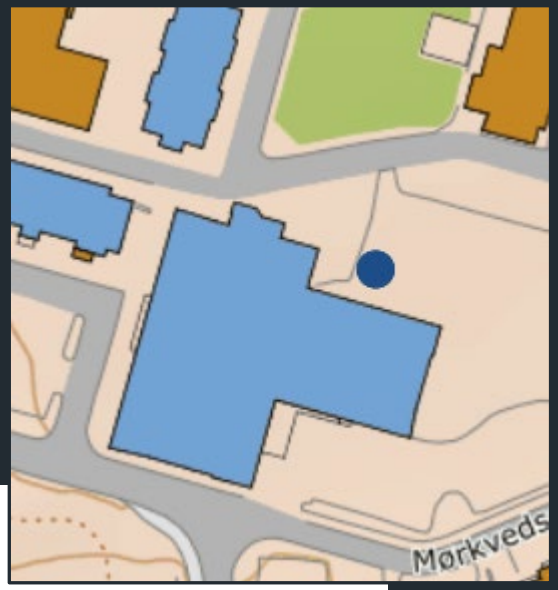
1:M

Geotechnical Borehole

1:M

Geotechnical Borehole Survey

Lokal ID	
Geoteknisk borehull ID	123d81e2-5767-4f8 23806a9f9115
Geoteknisk borehull URL	http://l2001-ivesve.
Faktaark URL	https://geo.ngu.no/



*) National Database for Ground investigations

Navigation structure – administrative areas I

GRANADA *)

Well Parks per County

Fylkesoversikt - Brønnparker — more information

Brønnparker fylkesvis

« ‹ 1 2 › »

HTML

County

Agder

Fylkesnavn	Agder
Fylkesnavn ID	Agder
Fylkesnummer	42
Kommuneoversikt	http://l2001-ivesve.n
Brønnparker	http://l2001-ivesve.n

Innlandet

Fylkesnavn	Innlandet
Fylkesnavn ID	Innlandet

*) National Groundwater Database

Navigation structure – administrative areas II

GRANADA *)

Well Parks per Municipality

Kommuneoversikt - Brønnparker — more information

Brønnparker kommunevis

« ‹ 1 2 3 › »

HTML

Fylkesnavn	Agder
Fylkesnummer	42
Brønnparker	http://l2001-ivesve.ngu.no:708

Municipality

Arendal

Kommunenavn	Arendal
Kommunenavn ID	Arendal
Kommunenummer	4203
Fylkesnavn	Agder
Fylkesnummer	42
Brønnparker	http://l2001-ivesve.ngu.no:708

*) National Groundwater Database

Navigation structure – administrative areas III

GRANADA *)

Single Well Park

HTML

Brønnparker — more information

Her kommer en beskrivelse av brønnparker

« ‹ 1 2 3 ›

Brønnparknummer	1384
Brønnparkbrønner	http://l2001-ivesve....
Antall borehull	20
Geologisk medium	Fjell
Broennpark områ...	Barbudalen, Arendal
Spredning (m)	142
Etablert	2012-11-22
Fylkesnummer	42
Kommunenummer	4203
Faktaark URL	https://geo.ngu.no...

*) National Groundwater Database

Symbolization – MapLibre Style Spec

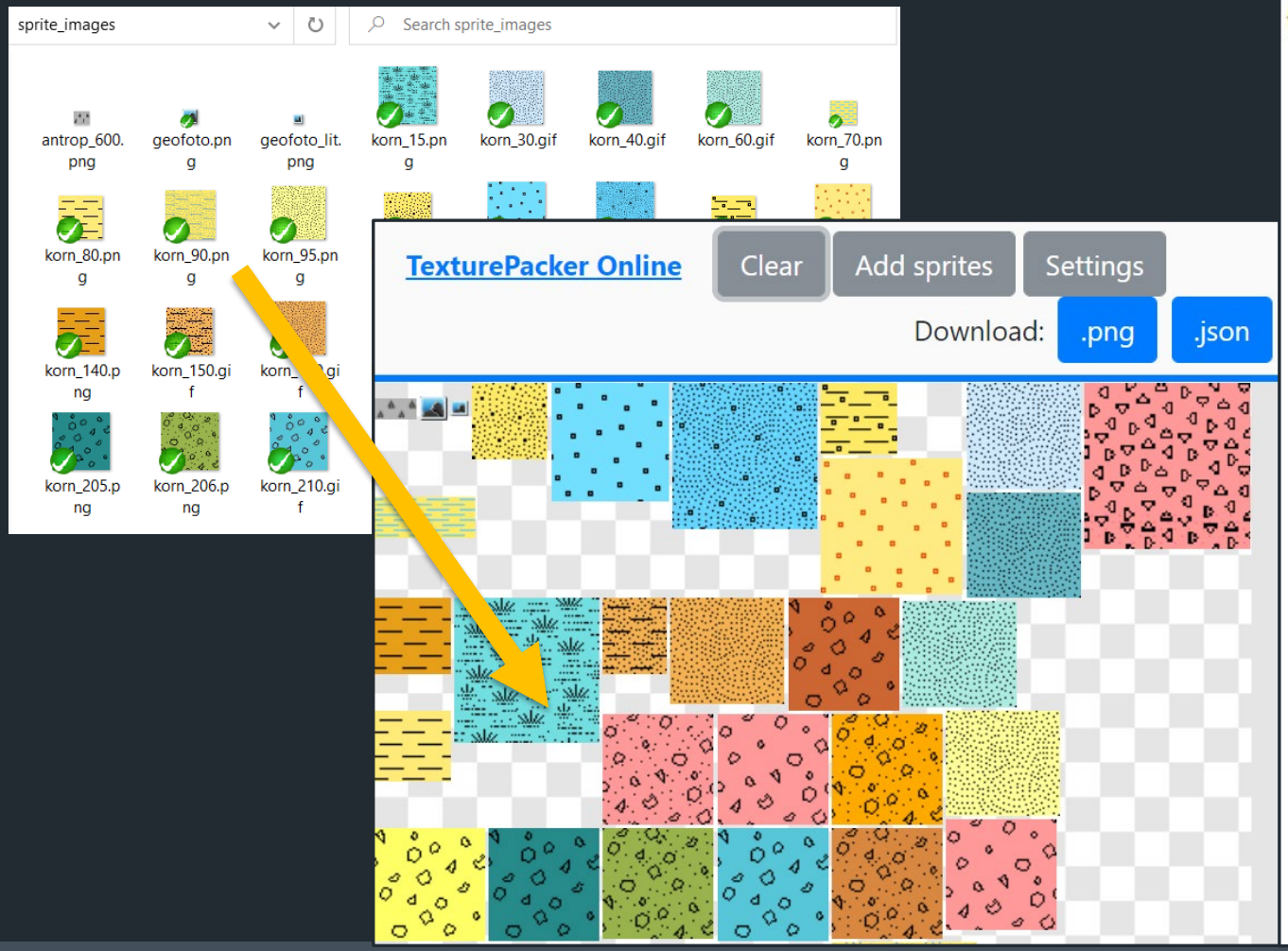
- **Point:**
  - Symbol “circle” is native, otherwise “Sprite”-symbols are used.
- **Line:**
  - Color, dash types and textures
- **Polygons:**
  - Color, border (Line) and textures
- **Ldproxy – symbolization in two levels:**
  - Service level (all collections)
  - Collection level (specific collection)

Symbolization - MapLibre Sprite

- **Today - single sprite**:
  "sprite": "{serviceUrl}/resources/sprite“
- **In the Future - multiple sprites (with namespace):**

```
"sprite": [
    {
        "id": "gruspukk",
        "url": "{serviceUrl}/resources/sprite“
    },
    {
        "id": "landtopo",
        "url": "https://cache.kartverket.no/test/sprites/landtopo"
    }
],
```

Symbolization – Sprite online tool




```
{
    "antrop_600.png": {
        "width": 24,
        "height": 12,
        "x": 1,
        "y": 1,
        "pixelRatio": 1
    },
    "geofoto.png": {
        "width": 16,
        "height": 14,
        "x": 27,
        "y": 1,
        "pixelRatio": 1
    },
    "geofoto_lit.png": {
        "width": 10,
        "height": 9,
        "x": 45,
        "y": 1,
        "pixelRatio": 1
    },
```

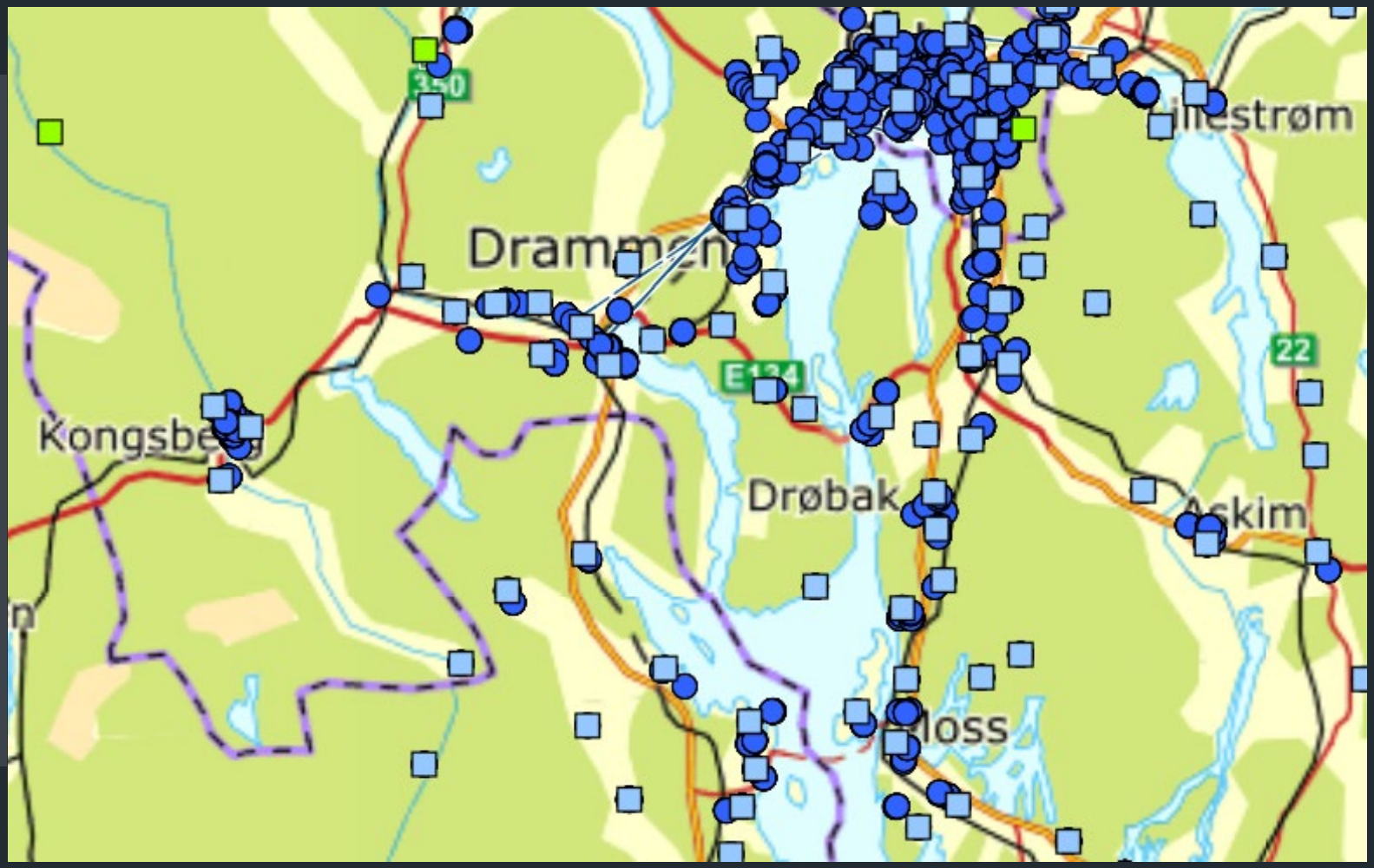
Symbolization – Structure

- sources
  - collection maps
  - …
  - base maps
  - …
- sprite
- glyphs
- layers
  - background layers
  - …
  - foreground layers
  - …

```
{
   "id":"bunnsedimentkornstorrelsedetalj_pattern",
   "type":"fill",
   "minzoom": 0,
   "maxzoom": 22,
   "source":"bunnsedimentkornstorrelse_bunnsedimentk
   "source-layer":"bunnsedimentkornstorrelsedetalj",
   "layout":{
      "visibility":"visible"
   },
   "paint":{
      "fill-pattern":[
          "case",
          ["==", ["get","sedkornstorrelse"], "30"],
          "korn_30.gif",
          ["==", ["get","sedkornstorrelse"], "90"],
          "korn_90.png",
          ""
      ],
      "fill-outline-color": [
          "case",
          ["==", ["get","sedkornstorrelse"], "600"],
          "rgba(60, 60, 60, 1)",
          "rgba(255, 255, 255, 0)"
      ]
   }
}
```

Symbolization - with points, Service level

GRANADA *)

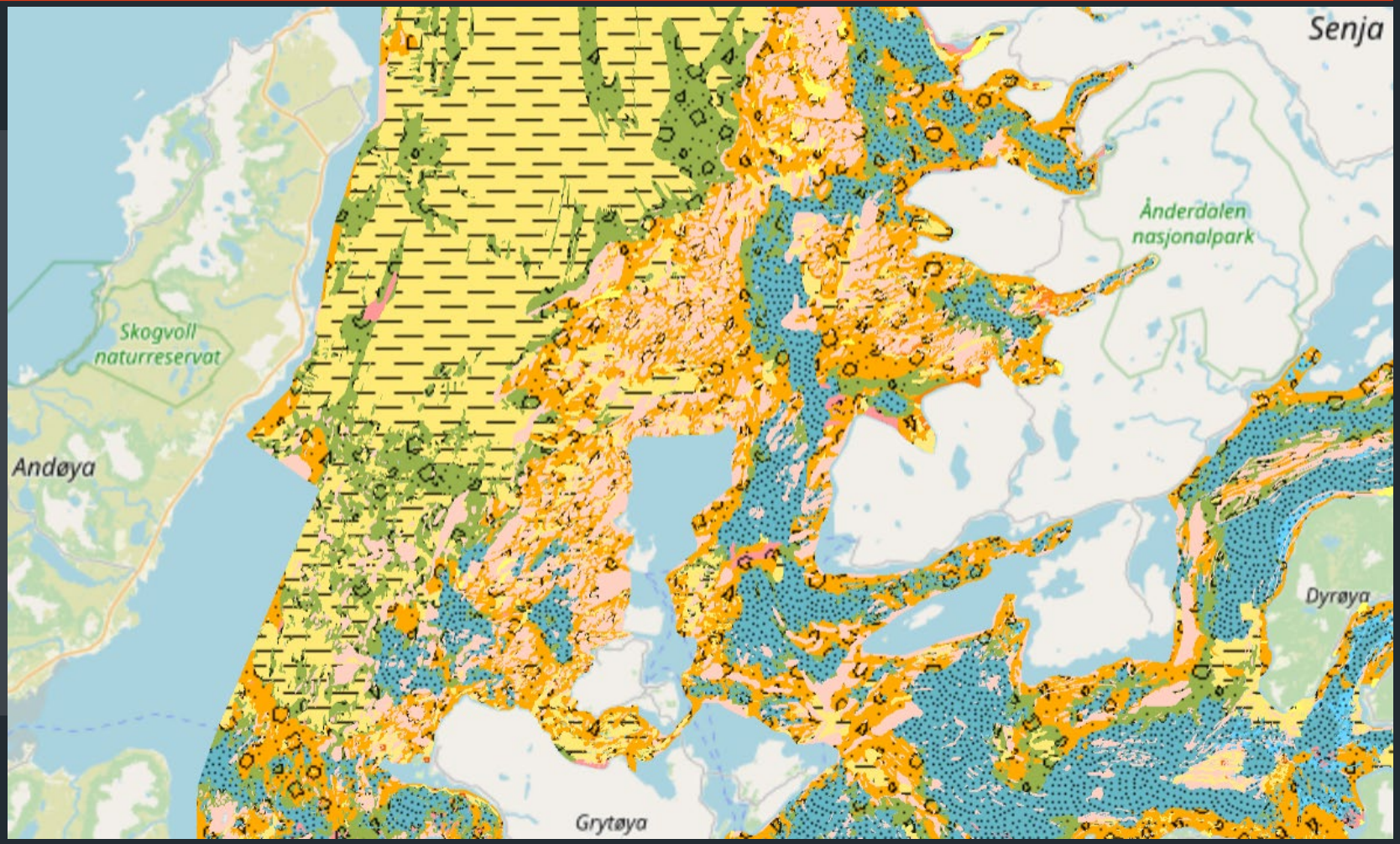


*) National Groundwater Database

Make queryable maps with OGC API Features

Symbolization - with texture, Collection lev.

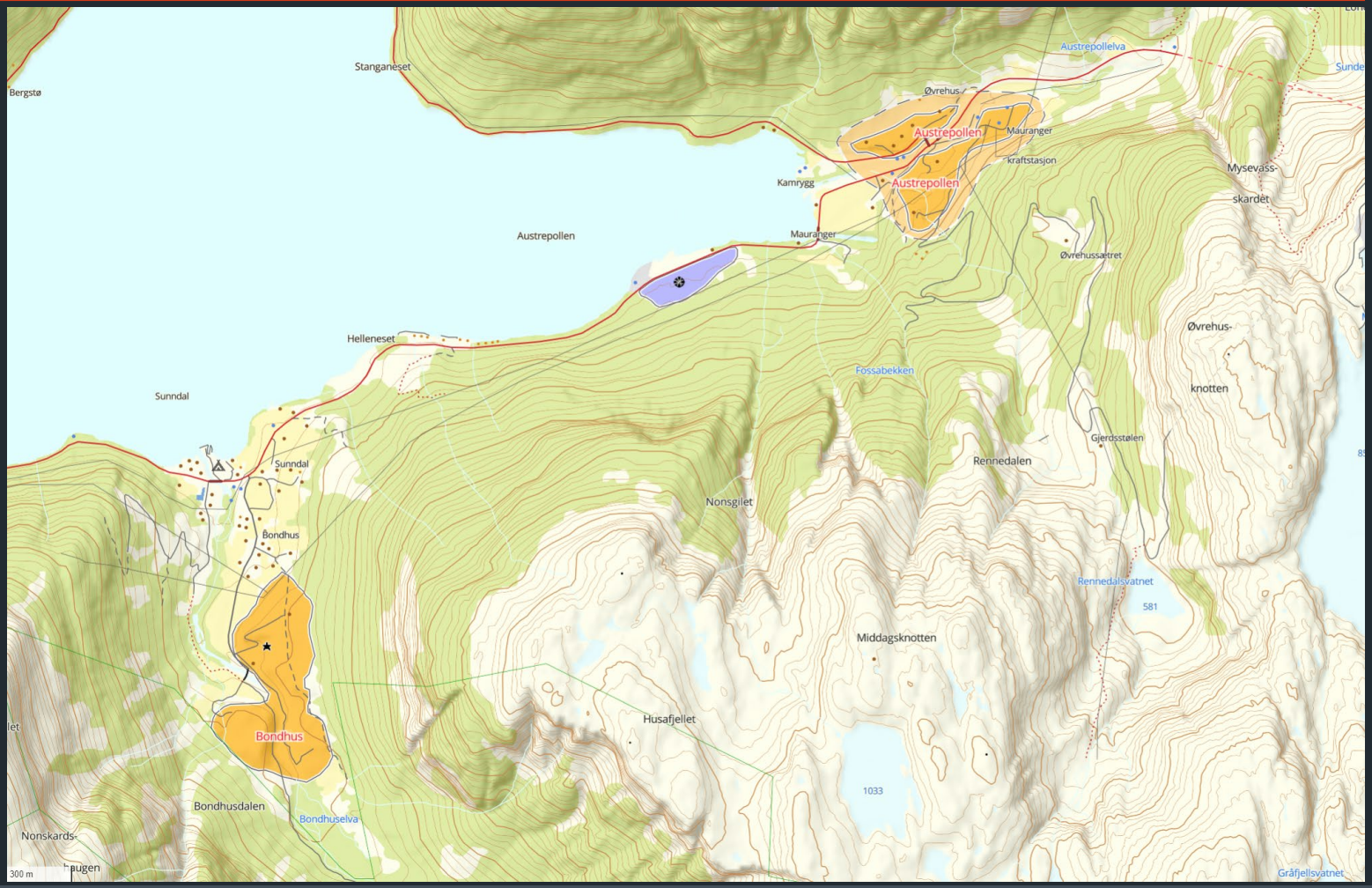
MARIN



Make queryable maps with OGC API Features

Symbolization – multiple vector tiles sources

GRAVEL & HARD ROCK AGGREGATE



Simple vs complex data structure I

Who will be the consumer?

- **Standard clients:**
  - Keep the structure flat.
  - Avoid complex properties
  - Collections without geometry should be possible to load and connect afterwards. The "geometry" property is required in GEOJSON, but "null" is a legal value.
- **Other:**
  - Complex data can be useful and necessary in other contexts where you have a more programmatic handling of the structure.

Simple vs complex data structure II

GRAVEL & HARD ROCK AGGREGATE

```
properties: { }
```

```
stoerrelser: {
    mektighet_m: 5,
    areal_m2: 44677,
    volum_m3: 223383,
},
```

```
point: {
    type: "Point",
  - coordinates: [
        5.6890111,
        62.3351374,
    ],
},
```

```
arealbruk: [
  - {
        formaal: "Annet",
        prosentverdi: "78",
    },
  - {
        formaal: "Dyrka mark",
        prosentverdi: "20",
    },
  - {
        formaal: "Utdrevet massetak",
        prosentverdi: "2",
    },
],
```

Simple vs complex data structure III

GRAVEL & HARD ROCK AGGREGATE

QGIS OGC API import

Grus- og steintippområde med s

id	101930
omr_navn	Strai
objekttype	SandGrusOmr
omr_materiale	Sand og grus
raastoffbetydning	Liten betydning
raastoffbetydning_	Klassifikasjon per 2015, er under revisjon
sist_oppdatert	14.06.2007
beskrivelse	grus. Forekomsten er bebygd og dyrket opp. Ingen snitt eller massetak. Liten ressursverdi pga. ensgradert sand og mye bebyggelse.
stoerrelser	{ "mektighet_m": 6, "areal_m2": 331286, "volum_m3": 1987717 }
fylkesnummer	42
kommunenummer	4204
arealbruk	rmaal": "Bebygd", "prosentverdi": "50" }, { "formaal": "Dyrka mark", "prosentverdi": "35" }, { "formaal": "Skog", "prosentverdi": "15" }]

{ "mektighet_m": 6, "areal_m2": 331286, "volum_m3": 1987717 }

[{ "formaal": "Bebygd", "prosentverdi": "50" }, { "formaal": "Dyrka mark", "prosentverdi": "35" }, { "formaal": "Skog", "prosentverdi": "15" }]

Simple vs complex data structure IV

GRAVEL & HARD ROCK AGGREGATE

Ldproxy does not support Curve geometry

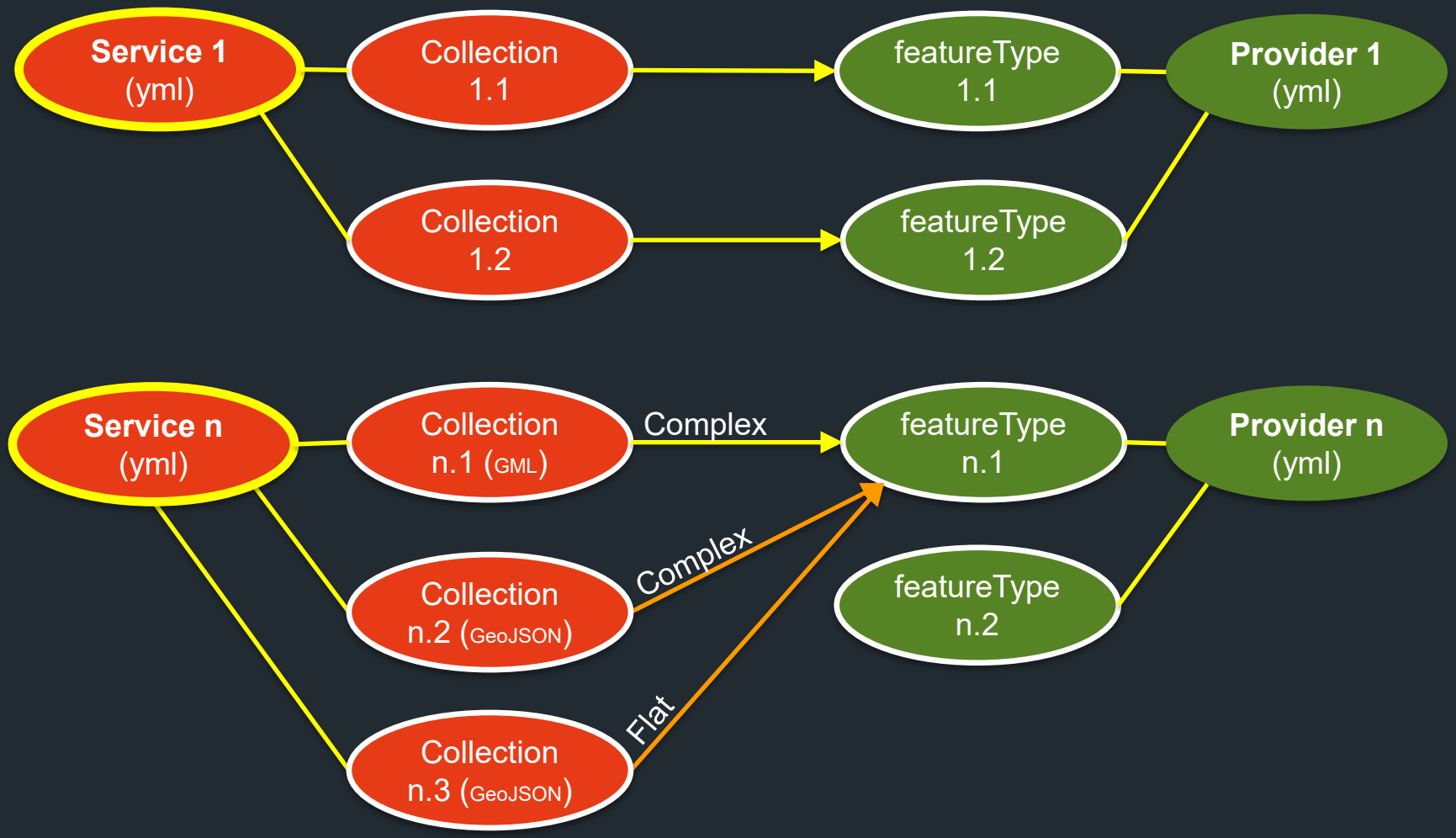
- **Find unsupported types:**
  - ST_GeometryType(shape)

db_type text	antall bigint
ST_CurvePolygon	2
ST_Polygon	11356
ST_MultiPolygon	29

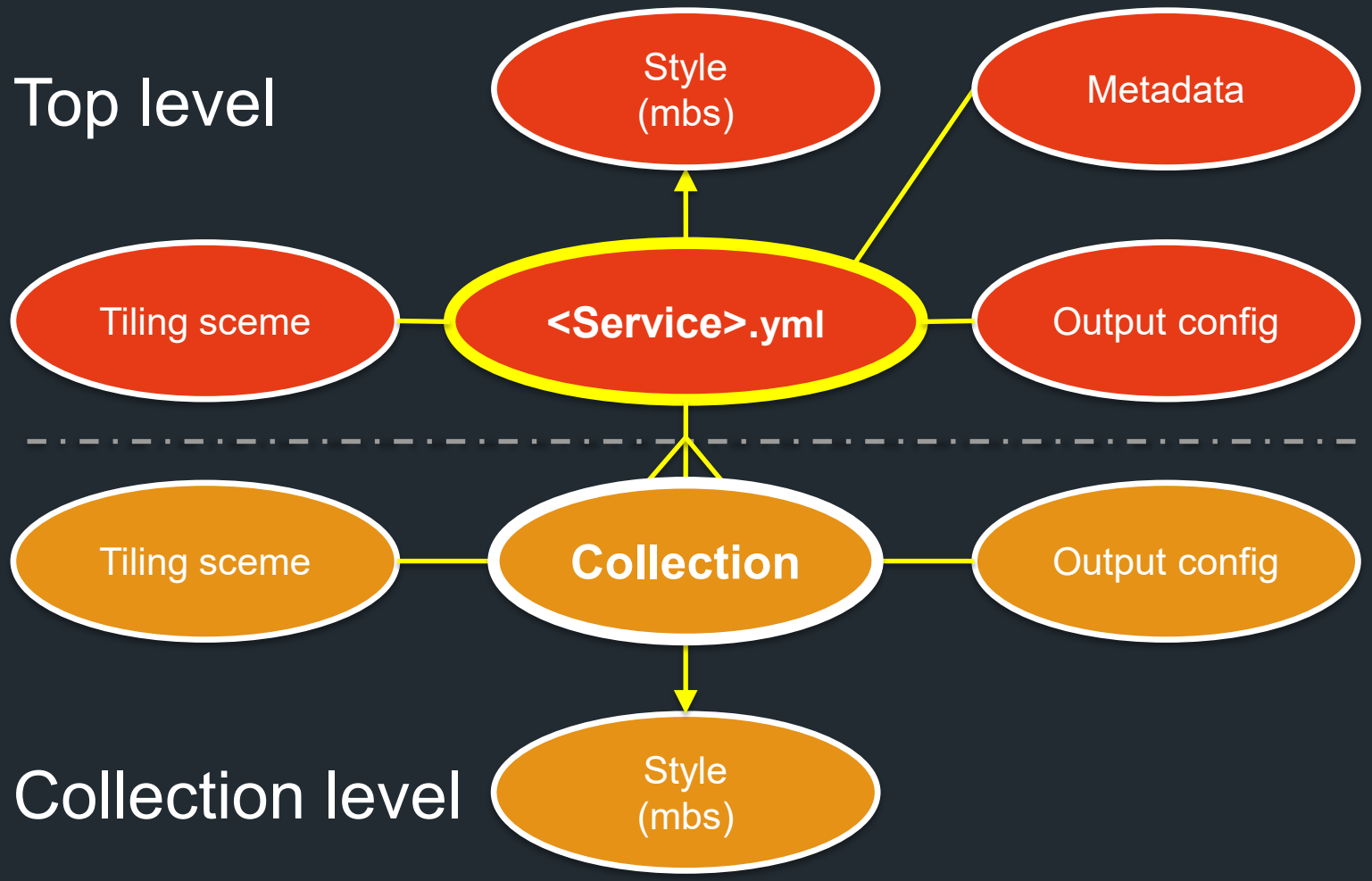
- **Vectorize & track:**
  - ST_CurveToLine(shape)

omr_id [PK] integer	omr_navn text	omr_virksomhet text	ld_type text	geometry geometry	db_type text
321298	Kvenndalen	Brudd	ST_Polygon	[illegible]	ST_CurvePolygon
99089	Stoa pukkverk	Anleggspukkverk	ST_Polygon	[illegible]	ST_CurvePolygon

Configuration – Service vs Provider



Configuration – <service>.yml



Configuration - output formats

- **GML:**
  - GML delivery per Collection including xlink
  - Xlink (uuids) will refer to external objects
- **JSON & JSON FG**
  - Complex structure
  - Flat structure
- **Other formats: CSV, …**
- **All formats:**
  - Renaming of attributes

Demo - Collections

https://demo.ldproxy.net

- 3D Buildings – 3D Tiles
- Vineyards – filter builder

Demo – Vineyards filter 1

cql2-text	cql2-json
region='Rheinhessen‘	{ "op": "=", "args": [{ "property": "region" }, "Rheinhessen"] }
HTML JSON (read notes)	HTML JSON (read notes)

Demo – Vineyards filter 2

cql2-text

region='Rheinhessen‘

AND cluster='Sankt Alban‘

AND registerId > 720925

HTML JSON (read notes)

cql2-json

```
{
        "op": "and",
        "args": [
                {
                        "op": "=",
                        "args": [
                                {
                                        "property": "region"
                                },
                                "Rheinhessen"
                        ]
                },
                {
                        "op": "=",
                        "args": [
                                {
                                        "property": "cluster"
                                },
                                "Sankt Alban"
                        ]
                },
                {
                        "op": ">",
                        "args": [
                                {
                                        "property": "registerId"
                                },
                                720925
                        ]
                }
        ]
}
```

HTML JSON (read notes)

Finally

- **Ldproxy:**
  - https://demo.ldproxy.net/
  - https://github.com/interactive-instruments/ldproxy
  - https://docs.ldproxy.net/
  - Active contributors: Clemens Portele++
  - Discussions, feature request, …
- **Ldproxy services from the Geological Survey:**
  - not ready for the public yet

Thank you ☺

Sverre Iversen

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