

MITEN PAIKKATIETOALUSTAN PALVELUT EDISTÄVÄT INSPIRE- YHTEENTOIMIVUUTTA?

OGC API - FEATURES -PILOTTIRAJAPINNAT AU/SU -TEEMOISTA
SAMPO SAVOLAINEN, SPATINEO OY
LASSI LEHTO, MAANMITTAUSLAITOS



BACK **TO THE FUTURE** **OF INSPIRE AND DGC**

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CONTENTS

OGC API Features & GeoJSON

- Use case: national and INSPIRE AU & SU data

API Features service and producing the data

Model simplification to produce an “INSPIRE” GeoJSON “schema”

Lessons learned

OGC API FEATURES AND GEOJSON?

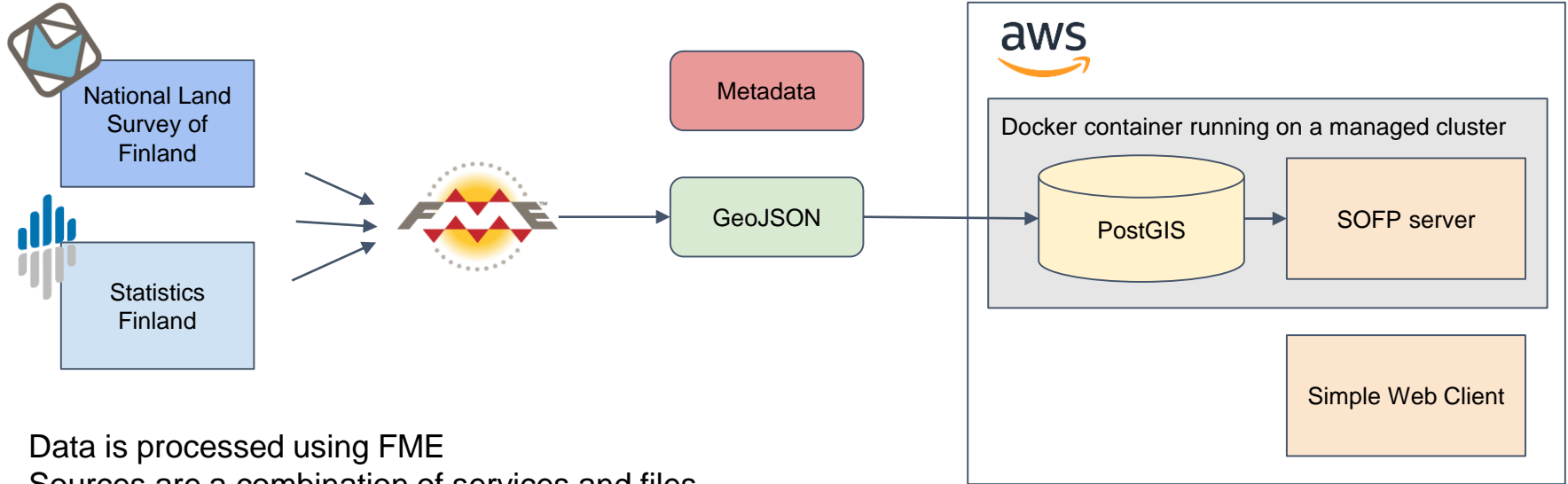
New generation of spatial data access focused on interoperability with Web technologies

Self-documenting APIs: human and machine readable formats

Not a full replacement to WFS, but another API for data access

Planned to become a new class of OGC services (Coverages, Map Tiles, Processing tested in a testbed in 2019)

ARCHITECTURE



Data is processed using FME

Sources are a combination of services and files

Server is open source (SOFP, developed by Spatineo, Vaisala & FMI)

Data + server packaged as a Docker container

Served on AWS

A simple web client has been developed

ADMINISTRATIVE UNITS

Geometria (MML)

MML:n toimittamat aineistot

- Hallinnolliset yksiköt GML
- Merialueilla leikatut kuntien rajat .shp

Luokitukset ja luokitusavaimet (Tilastokeskus)

Tilastokeskuksen rajapinta

(<https://data.stat.fi/api/classifications/v2/classifications/>)

- Kunta
- Maakunta
- Aluehallintovirasto

Pinta-alat (MML)

MML:n tilastot

- Pinta-alat kunnittain
(<https://www.maanmittauslaitos.fi/tietoa-maanmittauslaitoksesta/organisaatio/tilastot>)

Inspire AU

Kansallinen AU

ADMINISTRATIVE BOUNDARIES

Geometria (MML)

MML:n toimittamat aineistot

- Hallinnolliset yksiköt GML
- Hallinnolliset raja-aineistot GML

Luokitukset ja luokitusavaimet (Tilastokeskus)

Tilastokeskuksen rajapinta

(<https://data.stat.fi/api/classifications/v2/classifications/>)

- Kunta
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Inspire AB

Kansallinen AB

STATISTICAL UNITS

Geometria (MML)

MML:n toimittamat aineistot

- Hallinnolliset yksiköt GML
- Merialueilla leikatut kuntien rajat .shp

Luokitukset ja luokitusavaimet (Tilastokeskus)

Tilastokeskuksen rajapinta

(<https://data.stat.fi/api/classifications/v2/classifications/>)

- Kunta
- Maakunta
- Aluehallintovirasto
- Seutukunnat
- Suuralueet
- Ely
- Vaalipiirit
- Työssäkäyntialueet

Pinta-alat (MML)

MML:n tilastot

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Inspire SU

Kansallinen SU

COLLECTION STRUCTURE

Collections (tietokokoelma):

- INSPIRE AB, AU, SU (Admin Boundaries & Units, Stats Units)
- National AB, AU, SU

Variations for different geometry scales, CRSs (EPSG:3067 & WGS84), inclusion/exclusion of sea areas

Previous years of data represented as sub-collections:

`su_inspire_100k_wgs84/2018`

COMPARISON WITH TG PROPOSAL

Draft proposal on OGC API Features Download Service ([link](#))

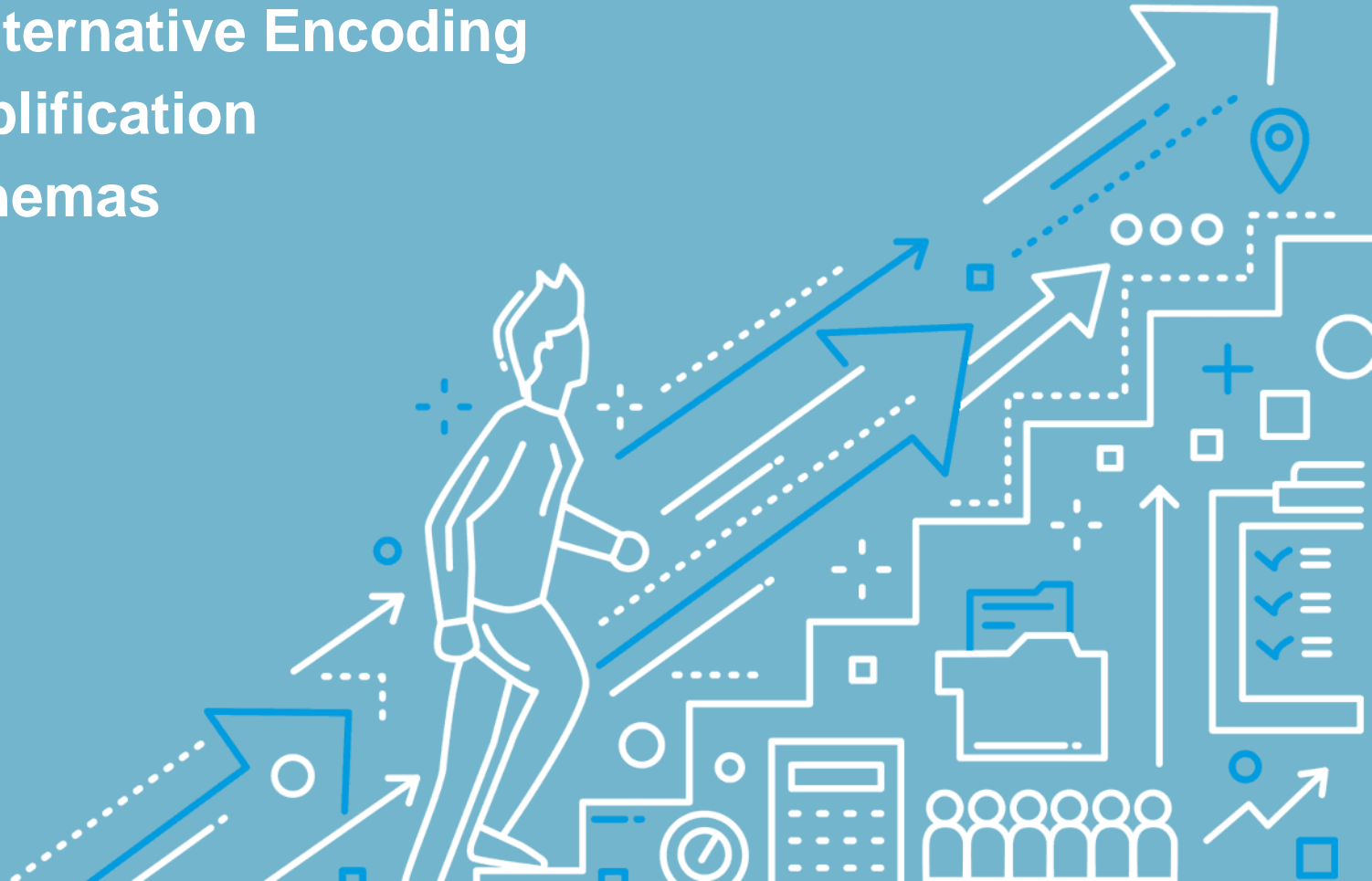
This implementation differs in these key areas

- Draft proposes one service for one data set (as opposed to single service here)
- Bulk download (“enclosure” links) not supported
- No support multi-language

INSPIRE Alternative Encoding

Model simplification

AU, SU schemas



INSPIRE ALTERNATIVE ENCODING

MIG-T working group produced:

- Model Simplification Rules
- General UML-to-JSON Encoding Rule
- Theme-specific encoding examples for themes
 - Addresses
 - Environmental Monitoring Facilities

MAIN PROBLEMS TO BE TACKLED

- Structural attributes
- Multiple valued attributes
- Feature references
- Abstract geometry types (loose typing)
- Mixed geometry types

MODEL SIMPLIFICATION RULES

- General Flattening
- Extract Primitive Arrays
- Association to Composition
- Composition to Association
- Simple Geographic Name
- Simple Citation
- Simplified Codelist Reference
- Simple Period

MODEL SIMPLIFICATION RULES

- General Flattening
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GENERAL FLATTENING, ORIGINAL

```
<au:inspireId>  
  <base:Identifier>  
    <base:localId> kunta_1_20190101_091 </base:localId>  
    <base:namespace>  
      http://paikkatiedot.fi/so/1001074/au/AdministrativeUnit/  
    </base:namespace>  
    <base:versionId>2019</base:versionId>  
  </base:Identifier>  
</au:inspireId>
```


GENERAL FLATTENING, SIMPLIFIED

```
<au:inspireId_localId>kunta_1_20190101_091</au:inspireId_localId>
```

```
<au:inspireId_namespace>
```

```
    http://paikkatiedot.fi/so/1001074/au/AdministrativeUnit/
```

```
</au:inspireId_namespace>
```

```
<au:inspireId_versionId>2019</au:inspireId_versionId>
```

GENERAL FLATTENING, GeoJSON

```
{  
  "inspireId_localId": "kunta_1_20190101_091",  
  "inspireId_namespace":  
    "http://paikkatiedot.fi/so/1001074/au/AdministrativeUnit",  
  "inspireId_versionId": 2019  
}
```

EXTRACT PRIMITIVE ARRAYS, ORIGINAL

<au:lowerLevelUnit xlink:href="FI_AU_ADMINISTRATIVEUNIT_REGIONAL_STATE_ADMINISTRATIVE_AGENCY_1"/>

<au:lowerLevelUnit xlink:href="FI_AU_ADMINISTRATIVEUNIT_REGIONAL_STATE_ADMINISTRATIVE_AGENCY_6"/>

<au:lowerLevelUnit xlink:href="FI_AU_ADMINISTRATIVEUNIT_REGIONAL_STATE_ADMINISTRATIVE_AGENCY_4"/>

<au:lowerLevelUnit xlink:href="FI_AU_ADMINISTRATIVEUNIT_REGIONAL_STATE_ADMINISTRATIVE_AGENCY_7"/>

<au:lowerLevelUnit xlink:href="FI_AU_ADMINISTRATIVEUNIT_REGIONAL_STATE_ADMINISTRATIVE_AGENCY_2"/>

<au:lowerLevelUnit xlink:href="FI_AU_ADMINISTRATIVEUNIT_REGIONAL_STATE_ADMINISTRATIVE_AGENCY_5"/>

<au:lowerLevelUnit xlink:href="FI_AU_ADMINISTRATIVEUNIT_REGIONAL_STATE_ADMINISTRATIVE_AGENCY_3"/>

EXTRACT PRIMITIVE ARRAYS, GeoJSON

```
{  
  "lowerLevelUnit": [  
    "avi_1_20190101_6",  
    "avi_1_20190101_1",  
    "avi_1_20190101_7",  
    "avi_1_20190101_2",  
    "avi_1_20190101_5",  
    "avi_1_20190101_4",  
    "avi_1_20190101_3"  
  ]  
}
```

SIMPLIFIED GEOGR. NAME, ORIGINAL

<au:name>

<gn:GeographicalName>

<gn:language>fin</gn:language>

<gn:nativeness xlink:href="http://inspire.ec.europa.eu/codelist/NativenessValue/endonym"/>

<gn:nameStatus xlink:href="http://inspire.ec.europa.eu/codelist/NameStatusValue/official"/>

<gn:sourceOfName>National Land Survey of Finland</gn:sourceOfName>

<gn:pronunciation xsi:nil="true" nilReason="other:unpopulated"/>

<gn:spelling>

<gn:SpellingOfName>

<gn:text>Suomi</gn:text>

<gn:script>Latn</gn:script>

</gn:SpellingOfName>

</gn:spelling>

</gn:GeographicalName>

SIMPLIFIED GEOGR. NAME, ORIGINAL

<au:name>

<gn:GeographicalName>

<gn:language>swe</gn:language>

<gn:nativeness xlink:href="http://inspire.ec.europa.eu/codelist/NativenessValue/endonym"/>

<gn:nameStatus xlink:href="http://inspire.ec.europa.eu/codelist/NameStatusValue/official"/>

<gn:sourceOfName>National Land Survey of Finland</gn:sourceOfName>

<gn:pronunciation xsi:nil="true" nilReason="other:unpopulated"/>

<gn:spelling>

<gn:SpellingOfName>

<gn:text>Finland</gn:text>

<gn:script>Latn</gn:script>

</gn:SpellingOfName>

</gn:spelling>

</gn:GeographicalName>

SIMPLIFIED GEOGR. NAME, SIMPLIFIED

<au:name_fin>Suomi</au:name_fin>

<au:name_swe>Finland</au:name_swe>

SIMPLIFIED GEOGR. NAME, GeoJSON

```
{  
  "name_fin": "Suomi",  
  "name_swe": "Finland",  
}
```


SIMPLIFIED CODELIST REF, ORIGINAL

```
<au:nationalLevel  
  xlink:href="http://inspire.ec.europa.eu/codelist/AdministrativeHierarchyLevel/1stOrder"/>
```

```
<au:country>  
  <gmd:Country codeList="http://xml.nls.fi/inspire/2010-04/codelists/CountryCode.xml"  
    codeListValue="FI">FI</gmd:Country>  
</au:country>
```

SIMPLIFIED CODELIST REF, GeoJSON

```
{  
  "nationalLevel": "1stOrder",  
  "country": "FI",  
}
```

AU SUOMI, GML

```
<au:AdministrativeUnit gml:id="FI_AU_ADMINISTRATIVEUNIT_COUNTRY_FI"><gml:identifier
codeSpace="http://paikkatiedot.fi">http://paikkatiedot.fi/so/1001074/au/AdministrativeUnit/COUNTRY_FI</gml:identifier><au:geometry><gml:MultiSurface
srsDimension="2" srsName="http://www.opengis.net/def/crs/EPSS/0/3067"><gml:surfaceMember><gml:Polygon
srsDimension="2"><gml:exterior><gml:LinearRing><gml:posList>
</gml:posList></gml:LinearRing></gml:exterior></gml:Polygon></gml:surfaceMember></gml:MultiSurface></au:geometry><au:nationalCode>FI</au:nati
onalCode><au:inspireId><base:Identifier><base:localId>COUNTRY_FI</base:localId><base:namespace>http://paikkatiedot.fi/so/1001074/au/Administrat
iveUnit</base:namespace></base:Identifier></au:inspireId><au:nationalLevel
xlink:href="http://inspire.ec.europa.eu/codelist/AdministrativeHierarchyLevel/1stOrder"/><au:nationalLevelName><gmd:LocalisedCharacterString
locale="fi-FI">Valtio</gmd:LocalisedCharacterString></au:nationalLevelName><au:nationalLevelName><gmd:LocalisedCharacterString locale="sv-
FI">Stat</gmd:LocalisedCharacterString></au:nationalLevelName><au:nationalLevelName><gmd:LocalisedCharacterString locale="en-
GB">Country</gmd:LocalisedCharacterString></au:nationalLevelName><au:country><gmd:Country codeList="http://xml.nls.fi/inspire/2010-
04/codelists/CountryCode.xml"
codeListValue="FI">FI</gmd:Country></au:country><au:name><gn:GeographicalName><gn:language>fin</gn:language><gn:nativeness
xlink:href="http://inspire.ec.europa.eu/codelist/NativenessValue/endonym"/><gn:nameStatus
xlink:href="http://inspire.ec.europa.eu/codelist/NameStatusValue/official"/><gn:sourceOfName>National Land Survey of
Finland</gn:sourceOfName><gn:pronunciation xsi:nil="true"
nilReason="other:unpopulated"/><gn:spelling><gn:SpellingOfName><gn:text>Suomi</gn:text><gn:script>Latn</gn:script></gn:SpellingOfName></gn:sp
elling></gn:GeographicalName></au:name><au:name><gn:GeographicalName><gn:language>swe</gn:language><gn:nativeness
xlink:href="http://inspire.ec.europa.eu/codelist/NativenessValue/endonym"/><gn:nameStatus
xlink:href="http://inspire.ec.europa.eu/codelist/NameStatusValue/official"/><gn:sourceOfName>National Land Survey of
Finland</gn:sourceOfName><gn:pronunciation xsi:nil="true"
nilReason="other:unpopulated"/><gn:spelling><gn:SpellingOfName><gn:text>Finland</gn:text><gn:script>Latn</gn:script></gn:SpellingOfName></gn:sp
elling></gn:GeographicalName></au:name><au:residenceOfAuthority xsi:nil="true" nilReason="other:unpopulated"/><au:beginLifespanVersion
xsi:nil="true" nilReason="other:unpopulated"/><au:lowerLevelUnit
xlink:href="FI_AU_ADMINISTRATIVEUNIT_REGIONAL_STATE_ADMINISTRATIVE_AGENCY_1"/><au:lowerLevelUnit
xlink:href="FI_AU_ADMINISTRATIVEUNIT_REGIONAL_STATE_ADMINISTRATIVE_AGENCY_6"/><au:lowerLevelUnit
xlink:href="FI_AU_ADMINISTRATIVEUNIT_REGIONAL_STATE_ADMINISTRATIVE_AGENCY_4"/><au:lowerLevelUnit
xlink:href="FI_AU_ADMINISTRATIVEUNIT_REGIONAL_STATE_ADMINISTRATIVE_AGENCY_7"/><au:lowerLevelUnit
xlink:href="FI_AU_ADMINISTRATIVEUNIT_REGIONAL_STATE_ADMINISTRATIVE_AGENCY_2"/><au:lowerLevelUnit
xlink:href="FI_AU_ADMINISTRATIVEUNIT_REGIONAL_STATE_ADMINISTRATIVE_AGENCY_5"/><au:lowerLevelUnit
xlink:href="FI_AU_ADMINISTRATIVEUNIT_REGIONAL_STATE_ADMINISTRATIVE_AGENCY_3"/></au:AdministrativeUnit>
```

AU SUOMI, GeoJSON

```
{ "id": "valtio_1_20190101", "type": "Feature", "geometry": { "type":  
  "MultiPolygon", "coordinates": [], }, }, "properties": { "inspireId_localId":  
  "valtio_1_20190101", "inspireId_versionId": 2019, "inspireId_namespace":  
  "http://paikkatiedot.fi/so/1001074/au/AdministrativeUnit/",  
  "beginLifespanVersion": "2019-01-01", "endLifespanVersion": "2020-01-01",  
  "country": "FI", "name_fin": "Suomi", "name_swe": "Finland", "name_eng":  
  "Finland", "nationalCode": "FI", "nationalLevel": "1stOrder", "nationalLevelName":  
  "valtio", "upperLevelUnit": [], "lowerLevelUnit": [ "avi_1_20190101_6",  
  "avi_1_20190101_1", "avi_1_20190101_7", "avi_1_20190101_2",  
  "avi_1_20190101_5", "avi_1_20190101_4", "avi_1_20190101_3" ] } }
```

AU AND SU SCHEMA

- Administrative Units (AU) ja Statistical Units (SU)
 - No existing schema proposal from INSPIRE process
 - Local schemas developed by NLS
 - Limited to the content that is available in Finland
 - Can be seen as proposals for wider use in INSPIRE

AU

- Kuntaraja
- Maakuntaraja
- Aluehallintovirastoraja
- Valtakuntaraja
- Kunta
- Maakunta
- Aluehallintovirasto
- Valtakunta

SU

- Suuralue
- Seutukunta
- Vaalipiiri
- Työssäkäyntialue
- ELY



Kunta

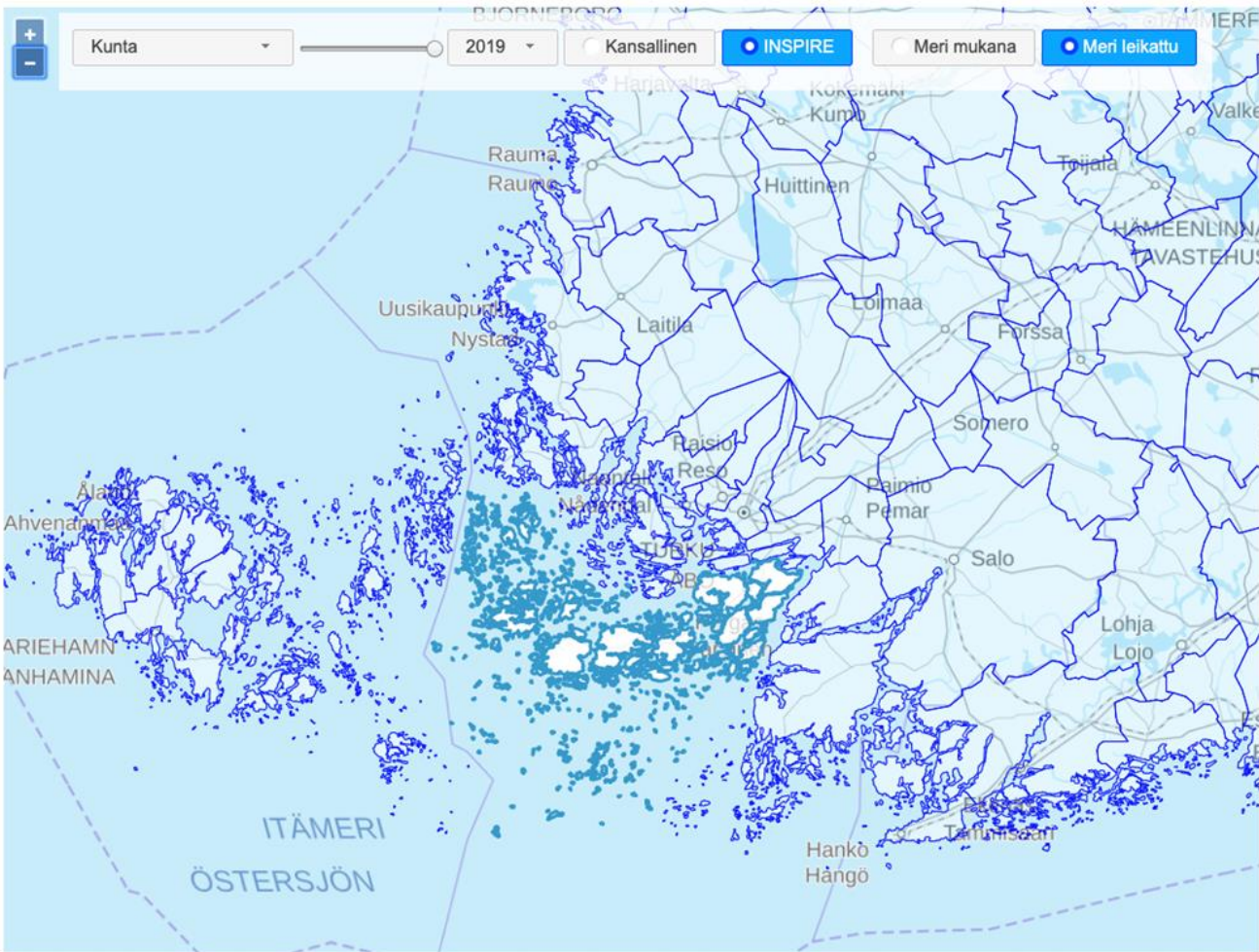
2019

Kansallinen

INSPIRE

Meri mukana

Meri leikattu



```
{
  "inspireid_localid": "kunta_1_20190101_445",
  "inspireid_versionid": 2019,
  "inspireid_namespace": "http://paikkatiedot.fi/so/1001074/au/AdministrativeUnit/",
  "beginLifespanVersion": "2019-01-01",
  "endLifespanVersion": "2020-01-01",
  "country": "FI",
  "name_fin": "Parainen",
  "name_swe": "Pargas",
  "name_eng": "Pargas",
  "nationalCode": "445",
  "nationalLevel": "4thOrder",
  "nationalLevelName": "kunta",
  "upperLevelUnit": [
    "maakunta_1_20190101_02",
    "avi_1_20190101_2",
    "valtio_1_20190101"
  ],
  "lowerLevelUnit": []
}
```

LESSONS LEARNED 1/2

Harmonization issues between INSPIRE AU and SU, example:

- AU - name_fin
- SU - geographicalName_fin

A fit-for-purpose GeoJSON property schema is critical:

- Model simplification is necessary to make data easier to understand and digest in applications
- GeoJSON schema has a direct effect on the API calls - client use cases should be taken into account when designing the schema

LESSONS LEARNED 2/2

Feature geometry complexity might also hinder use:

- Some users require high level of detail while others can work with very coarse data
- Different LODs as separate collections helps, but is not a perfect solution
- A method for clients to choose the detail level (pre-generalised or on-the-fly) could be very helpful

CRS extension for API Features is not yet complete

LINKS

The service: <http://pta.spatineo-devops.com/sofp>

Example link to data: http://pta.spatineo-devops.com/sofp/collections/au_inspire_1000k_wgs84/items?f=html

Example client: <https://ausuclient.spatineo-devops.com/>

THANK YOU!

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