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GeoPackage for INSPIRE

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GeoPackage

- An Open (**OGC**) Format (**encoding**) for Geospatial Information (**for us**)
 - <https://www.geopackage.org/>
 - *“GeoPackage is an open, standards-based, platform-independent, portable, self-describing, compact format for transferring geospatial information.”*
- Can **store vector features, imagery, coverages, non spatial data, metadata**, ... and **can relate them** all in a single coherent model
- In a single **SQLite** file
 - A **SQL** compliant database ready to **plug and play!!!**

GeoPackage for INSPIRE

- **Our work** on GeoPackage + Encoding rules for INSPIRE
 - A **proposal** on <https://github.com/IAAA-Lab/U2G> with examples
 - And **more soon**
- **Key takeaways**
 - one table per feature
 - one table per relationship → related table extension
 - voidable → metadata extension
 - code list → schema extension

GeoPackage for INSPIRE, but ...

- **What is the current mood of INSPIRE towards GeoPackage?**
 - INSPIRE MWIP 2020-2024
 - 63rd MIG-T discussion on GeoPackage
- **Which is the best friend of GeoPackage for INSPIRE?**
- **Which is the worst enemy of GeoPackage for INSPIRE?**

INSPIRE MWIP 2020-2024

- **Favourable political and technological context for the evolution of INSPIRE**
- The current architecture of **INSPIRE is outdated**
- INSPIRE is often seen as a **monolithic infrastructure**
- **Emerging technologies** have to be included in INSPIRE

INSPIRE MWIP 2020-2024

- Core action 1.1 *“Towards a digital ecosystem for the environment and sustainability”*
 - *“Task 4. Create and endorsement of a stack of ‘enabling’ good practices for data provision (based on e.g. OGC APIs, different encodings: GeoJSON, **GeoPackage**, VectorTiles) in collaboration with standardisation bodies, software vendors and open source projects (estimated deadline: December 2024);”*
- GeoPackage can have even a bigger role:
 - OGC **Vector Tiles** Extensions for GeoPackage
<https://docs.ogc.org/per/18-074.html>
 - **GeoJSON** files can be stored in GeoPackage as attribute data

INSPIRE MWIP 2020-2024

- Core action 2.3 “*Simplification of INSPIRE implementation*”
 - **Bug fixing** → Lot of bugs in INSPIRE UML files found during my research on GeoPackage
 - **Modernisation, new reference architecture** → Get rid of the 2000-2005 SOA XML Web services based vision that constrains the implementation of INSPIRE
 - **Less XML/GML influence in architecture** → increased role of GeoPackage
- Core action 2.4 “Central infrastructure components”
 - **Validator** for GeoPackage for INSPIRE

63rd MIG-T discussion

- **Who leads**

- AT, BE, DK, ES, NL, EAA

- **Who shows interest to work**

- LU, IT, FI

- **Where are the results**

- <https://webgate.ec.europa.eu/fpfis/wikis/pages/viewpage.action?pageId=559350289&preview=/559350289/579045723/20201013%20GeoPackage.pdf>

63rd MIG-T highlights

- *“The GeoPackage standard (...) is mature enough”*
 - **True**, but few tools support all the extensions that are key for INSPIRE
- *“Too early to have a common INSPIRE GeoPackage encoding rule”*
 - **True**, mainly because INSPIRE lacks of a SQL encoding rule
- *“Flattening of the model should be taken into account as well”*
 - **Risky**, “flattening” for XML/JSON $\neq$ “flattening” for SQL
 - Flattening should be renamed as “schema denormalization” in GeoPackage

63rd MIG-T highlights

- *“Could we have a ad-hoc group where we can share experiences”*
 - **Good idea!**
 - Many members expressed interest to work on this
 - <https://github.com/INSPIRE-MIF/gp-geopackage-encodings/>
- *“We probably need a theme-by-theme approach”*
 - **Risky**, rules must be consistent across INSPIRE
 - Theme specific needs must be an exception → e.g. 3D Building

63rd MIG-T highlights

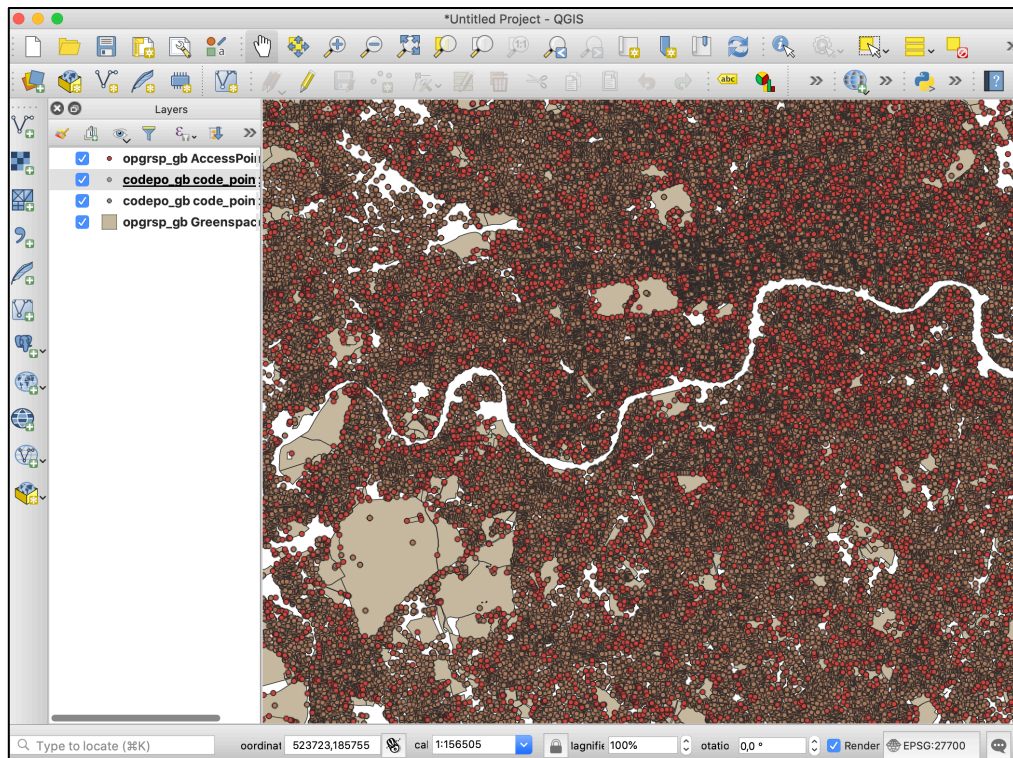
- *“How do we ensure that GeoJSON and GeoPackage encoding of the same dataset are not too divergent”*
 - **Sorry, they will be divergent**
 - Different encodings / different user needs / different implementation models
 - This is a nuisance for data producers
 - How divergent?
 - GeoJSON → Web/Small “data” scenarios
 - GeoPackage → Mobile/Rich/Big “data” scenarios
 - Example
 - A web app needs to display in a map addresses → Remote server + OGC API + GeoJSON
 - A mobile app needs to display in a map addresses → Embedded GeoPackage

63rd MIG-T highlights

- *“Could we do a survey among MIG-T members”*
 - **Good idea!**
 - Plans, issues, role as encoding, raster data, ...
- Other topics discussed
 - Metadata extension
 - **Good**, but also Schema extension and Related Tables extension are key for INSPIRE
 - How to validate a GeoPackage file?
 - **Possible** <https://cite.opengeospatial.org/teamengine/about/gpkg12/1.2/site/>
 - But we need better validations tools → acknowledged by GeoPackage editor
<https://github.com/opengeospatial/geopackage/issues/516#issuecomment-632689701>

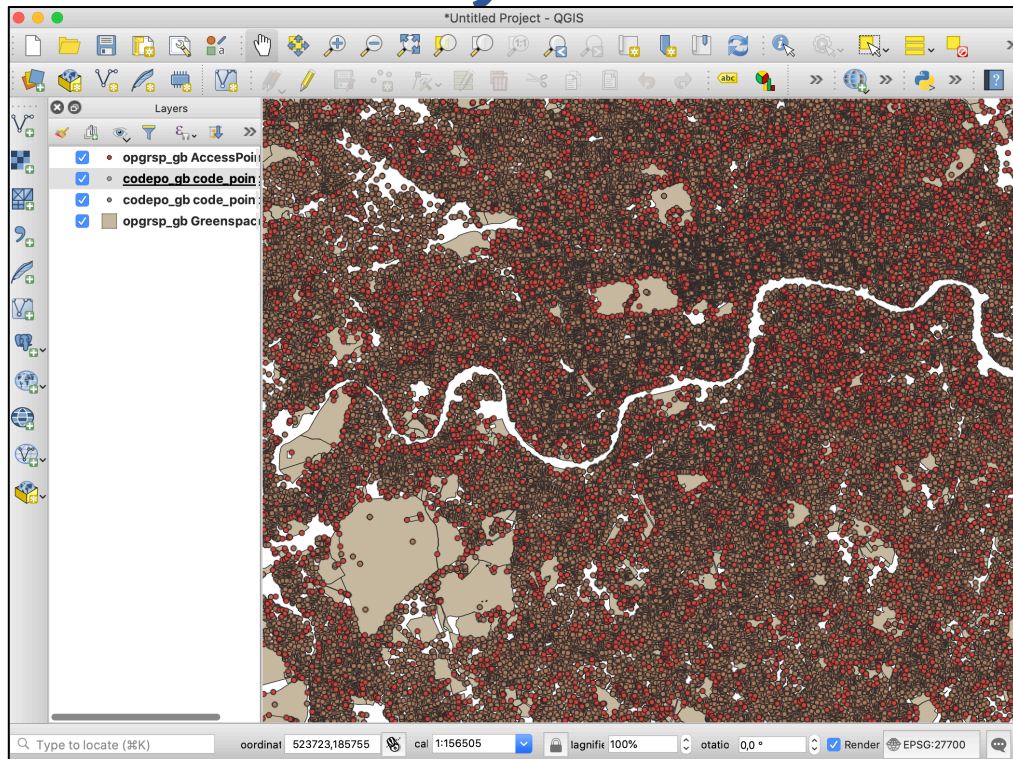
QGIS is our best friend!

- **Good GeoPackage support (GDAL based)**
- If you publish INSPIRE data encoded in a GeoPackage, **everyone will work with it!**



But also our worst enemy!

- **Bunch of shapefiles approach**
 - Blame QGIS User Interface
- **Lack of support of key extensions for INSPIRE**
 - Blame GDAL



Takeaways

- **GeoPackage could become part of INSPIRE 2020-2024 infrastructure**
- **Remember: QGIS is “a” use case, not “the” use case**
 - It is the use case that requires flattened/pruned models
- **GeoPackage is an ideal solution when users face connectivity issues, want plug-and-play data, require complex models or use huge amounts of INSPIRE data**
 - Big Data, Drones, Vehicles, Defence, Geo Intelligence, IoT, ...

Questions?

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