



## GeoPackage als Arbeits- und Austauschformat

@PirminKalberer  
Sourcepole AG, Zürich  
[www.sourcepole.ch](http://www.sourcepole.ch)





# GeoPackage

- › OGC Standard published 2014
- › “An open standard non-proprietary platform-independent GeoPackage container for distribution and direct use of all kinds of geospatial data”
- › Vector and Raster data stored in SQLite file DB
- › <http://www.geopackage.org/>



# GeoPackage introduction

- › **Spatial extension to SQLite embedded database**
  - › Like PostGIS extends PostgreSQL
  - › File based with SQL API
- › **Spatial data types**
- › **Raster and tile pyramid data sets**



# GeoPackage data

- › **OGC Simple Feature types (WKT, WKB)**
  - › Point, MultiPoint
  - › LineString, MultiLineString
  - › Polygon, MultiPolygon
  - › XY, XYZ, XYM, XYZM
- › **WKB based BLOB**
- › **One geometry column per table**
- › **R\*Tree index tables**
- › **Raster tile sets (PNG, JPEG)**



# Implementations

- › GDAL
- › QGIS
- › GeoTools
- › GeoServer
- › FME Desktop & Server (vector)
- › ArcGIS for Desktop, ArcGIS Pro (reading)
- › Geomedia (new default format)
- › MapInfo
- › and many more....



# Using GPKG in QGIS

- **Load from Browser, Drag and Drop, File dialog**
- **Create new GeoPackage**
- **Digitizing, Saving**
- **Intermediate format in Processing**
- **Limitations:**
  - Column editing (Rename, Add, Remove)
  - Editing views



## GeoPackage Extensions

This page lists GeoPackage extensions that are not currently part of the GeoPackage Encoding Standard developed outside of OGC. It is often preferable to use an existing extension (even if it is proprietary) or your own. Extensions that have widespread adoption will be considered for OGC approval.

### Related Tables

This extension provides a mechanism for associating tables with existing feature or attribute tables. In some things, it can be used to establish a many-to-many relationship between features and multimedia files. This extension was developed by the USGS and the plan is to test it during an upcoming OGC Interoperability Experiment.

### OWS Context

The main goal of the extension is to store context and styling of a mapping project as part of a GeoPackage. The extension aims at similar use cases as presented in [The USGS GeoPackage Styling](#). The approach is a bit different.

### Feature Tile Link

This extension creates a link between a feature and tile table. A tile table containing tiles that represent a feature can be linked to the feature table. The link enables feature queries when dealing with tiles representing a feature.

### Geometry Index

This extension defines a SQLite version agnostic way to index user feature table geometries by their bounding boxes for fast searches. Mobile implementations, including Android and iOS, use earlier versions of SQLite and cannot use the newer implementation. Each geometry in a feature table is indexed by its geometry id and x, y, z, and m values. This allows to be queried for fast retrieval of only geometries overlapping a desired envelope bounds.

### Aspatial Support (Legacy)

Support for aspatial data (ie. SQLite tables/views without a geometry column), potentially with associated metadata. This was used by default in GeoPackage v1.2.0 before the introduction of the 'attributes' data\_type of GeoPackage v1.2.1. This should be used by default instead.

### Tiled Gridded Elevation Data Extension (Draft)

Defines the rules for encoding and storing 16-bit and 32-bit tiled regular grid coverages composed of elevation. This extension is currently under revision and this document is scheduled to be updated in the future.

### User Defined Geometry Types (Deprecated)

Enables encoding of additional user-defined geometry types in ExtendedGeoPackageBinary format. This was removed from GeoPackage 1.2 due to interoperability reasons.

### Geometry Type Triggers (Deprecated)

Geometry type triggers prevent the storage of geometries of types that are not assignable from the geometry columns table in the geometry columns of the specified tables. This was removed from GeoPackage 1.2.

<http://www.geopackage.org/extensions.html>



# Useful Geopackage extensions

## › Non-Linear Geometry Types

- › [http://www.geopackage.org/spec/#extension\\_geometry\\_types](http://www.geopackage.org/spec/#extension_geometry_types)

## › Tiled Gridded Elevation Data

## › Feature Tile Link

## › OWS Context

## › OGIS Map styling information





# QGIS map styling extension

- › Store QGIS projects in GPKG-File
- › Includes graphics for styling (e.g. SVG markers) and print layouts (e.g. JPEG logos)
- › Implemented as QGIS plugin
- › Exchange data including map views!
  - › <https://github.com/pka/qgpkg>



# GPKG Plugin



Data + QGIS Project +  
Resources



# GeoPackage Advantages

- › Data exchange *and* direct use
- › Single file
- › Vector *and* raster
- › From mobile to server
- › Custom extensions mechanism
- › Promote GeoPackage
  - › Provide GeoPackage
  - › Ask for GeoPackage
- › Open Data!



## Danke!



@PirminKalberer