



Using game engines for 3D geospatial development

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3D GIS - «State of the Art»





3D Games - «State of the Art»





Game Engines – Top 3



- **Unreal Engine**
 - Epic Games
 - Free to use (5% royalty after \$1 mio. revenue)
- **Unity**
 - Unity Technologies
 - Free for personal use. Plans from \$400/year.
- **Godot**
 - Open Source
 - Software Freedom Conservancy
 - Community, ~ 10 funded developers



The game engine you waited for.

Godot provides a huge set of common tools, so you can just focus on making your game without reinventing the wheel.

Godot is completely free and open-source under the very permissive MIT license. No strings attached, no royalties, nothing. Your game is yours, down to the last line of engine code.

[Download](#) **3.2** [Learn more](#)

GodotCon 2021!

› <https://godotengine.org/>



Godot features 1/2



- **UI graphical and text based editors**
 - Linux, macOS, Windows and BSD
 - 30MB binary size
- **Nodes & scenes**
- **2D + 3D rendering**
- **Animations system**
- **Programmable**
 - GDScript (similar to Python)
 - GDNative: C#, C++, ...
 - Visual scripting



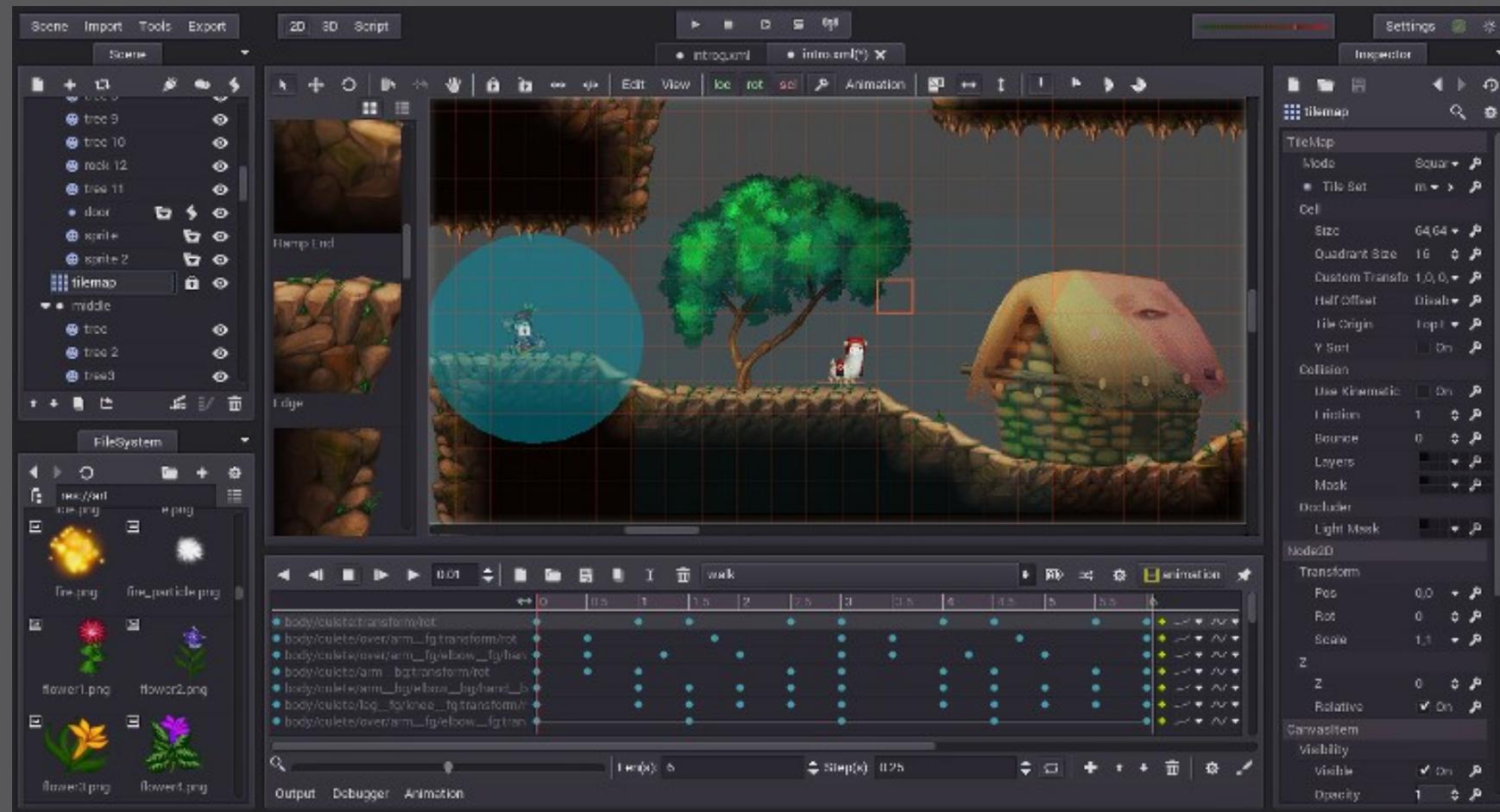
Godot features 2/2



- Logging, debugging, profiling
- XR support
 - Augmented and virtual reality
 - OpenVR, OpenXR, Oculus SDKs, ARKit, ...
- Export to several platforms
 - Linux, Mac + Windows
 - Android + iPhone
 - Web (WASM)



Godot demo

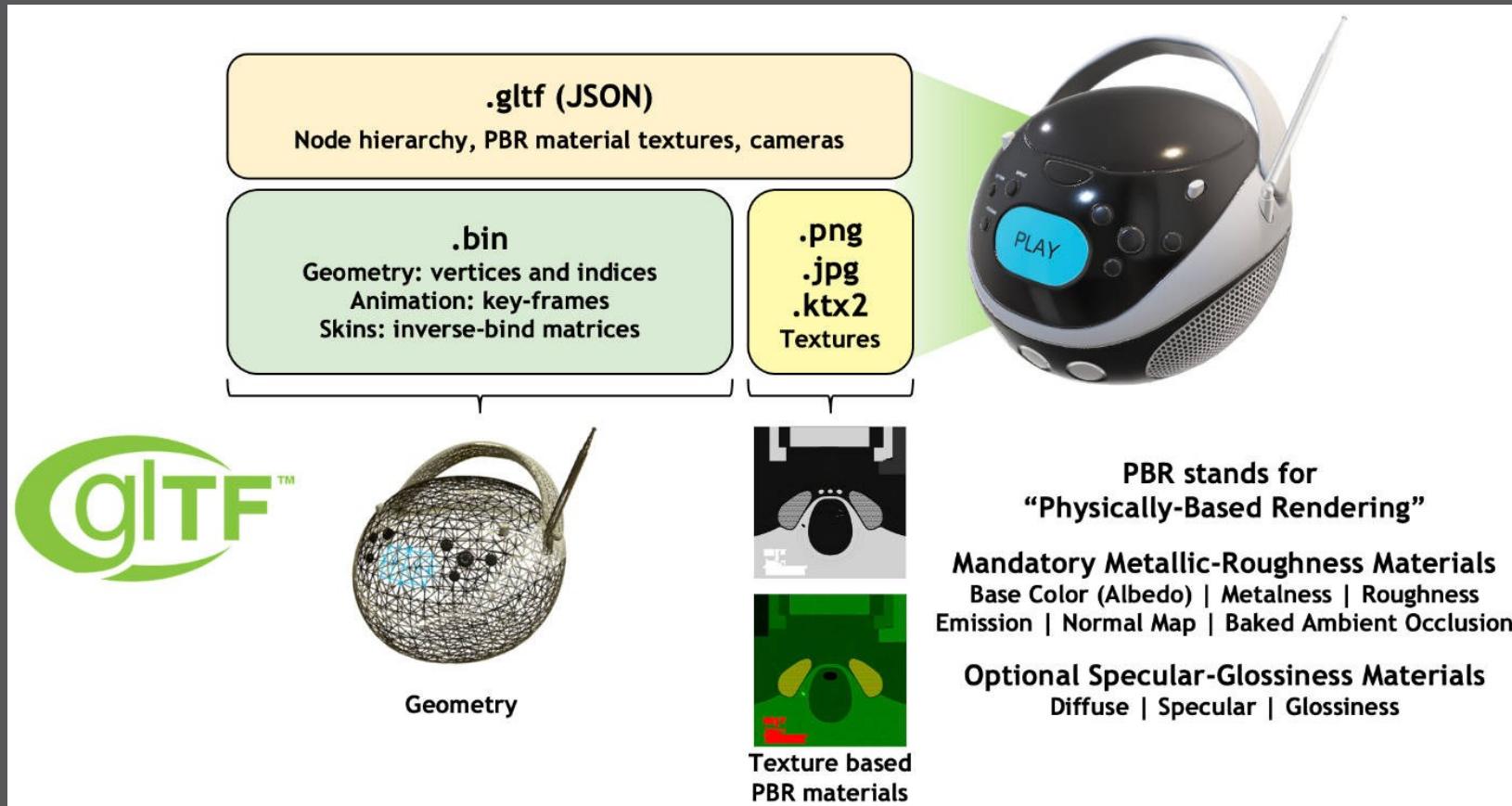




- **Raster data → Sprites, Textures**
- **Vector data → Meshes (OBJ, glTF, ...)**
- **Point clouds → Meshes, 3D Tiles**
- **Styling → Material (Textures, parametrized)**
- **Container (Scenes): glTF, ...**



- **CityGML / CityJSON**
 - CityGML 2.0 / CityJSON 1.0
 - OGC Standard
- **Indexed 3d Scene Layer (I3S)**
 - ESRI
 - OGC Community Standard
- **3D Tiles**
 - Cesium
 - OGC Community Standard



- Khronos group (OpenGL, etc.)



Blender



› <https://www.blender.org/>



➢ **Blender**

- Scene creation, Sculpting
- High quality rendering
- Animations
- Final product: Image or video animation

➢ **Godot**

- Programmable → interactive
- VR + AR applications
- Runtime for multiple platforms (desktop/mobile/web)
- Final product: Interactive application



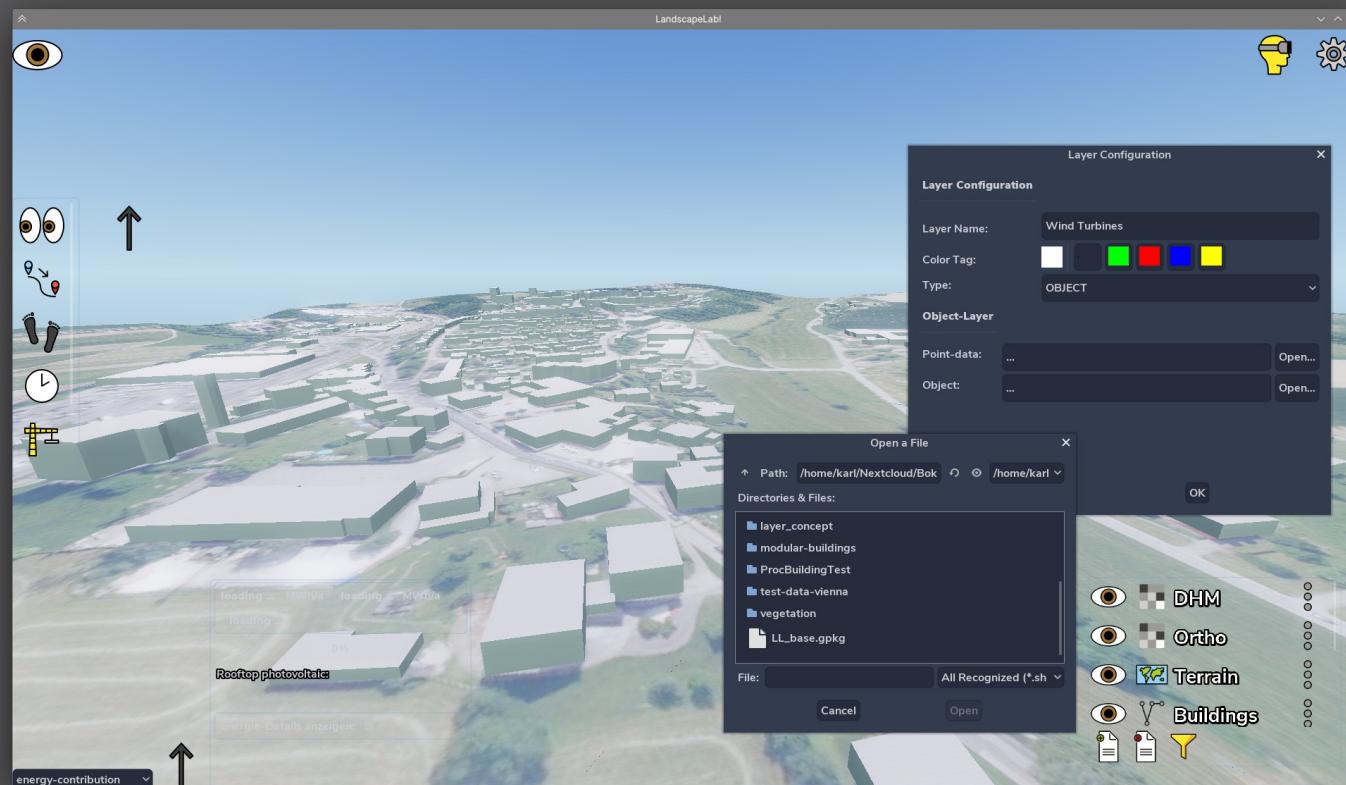
- **ESRI**
 - ArcGIS Maps SDK for Unity
 - ArcGIS Maps SDK for Unreal Engine
- **Cesium GS**
 - Cesium for Unreal
- **OGC**
 - Revision of I3S Community Standard
 - RfC CityGML 3.0
 - Interoperable Simulation and Gaming Sprint



- **DEM.Net Elevation API**
 - Web application + standalone
 - Terrain + OSM scene export
 - Free for personal / small business use
 - <https://elevationapi.com/>
- **HeightMap Terrain Plugin**
 - Optimized meshes from terrain data
 - Shaders for surfaces (grass, rock, ...)
 - `gdal_translate -of ENVI -ot UInt16 srtm.tif srtm.raw`
 - https://github.com/Zylann/godot_heightmap_plugin



Godot plugins: Geodot / LandscapeLab



› <https://github.com/boku-ilen/geodot-plugin>



› <https://landscapelab.boku.ac.at/>



- **Godot**
 - More formats:
 - FlatGeobuf, (COG)Geotiff, GPKG, PostGIS
 - 3D tile support
 - CAD / BIM formats
- **CityGML converter**
- **OSM data preparation pipeline**
- **Procedural city modelling**
- **Platform for models/textures (vegetation, traffic, etc.)**



- **Landscape planning**
- **City planning**
- **Transport planning**
- **Indoor-/outdoor navigation with AR**
- **Historical data**
- **GIS with VR user interactions**
- **Measuring, shadow-, visibility analysis (AR, VR)**
- **GPU based GIS calculations**



Thank you!



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