



**COBURG
UNIVERSITY**

of applied sciences and arts

Vista and ~~Vortex~~: EarthSync

Real-Time Simulation of Environmental Data as Part of the 3D Data Visualization Course

Prof. Dr.–Ing Carolin Helbig

Group Nr. 2 (a. k. a. TriDimensional)

Adrian Häfner | Maximilian Heß | Seyedmasih Tabaei

Final Presentation | 14.01.2024 | Winter Term 2024/25

EarthSync Architects: Team Members | Remember ? 🤖



Adrian Häfner

Visual Computing Student

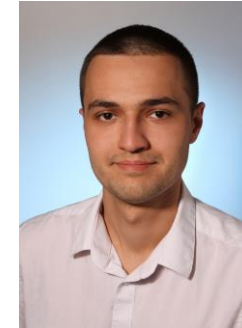
Unity
API Management
Data Pre-Processing



Maximilian Heß

Visual Computing Student

Blender
3D-Modelling
Data Gathering



Seyedmasih Tabaei (a. k. a. Masih)

Computer Science Student

Unity
Software Architecture
Git Maintenance



EarthSync Evolution: Key Milestones

- 1 Procedural Generation of Desired 3D Environments ✓
- 2 Data Gathering, Aggregation and Synchronization ✓
- 3 Visualizing Data in the 3D Environments ✓



Testing and documenting are both integrated in each step of development!



Refinement and Refactoring



EarthSync Evolution: Project Management

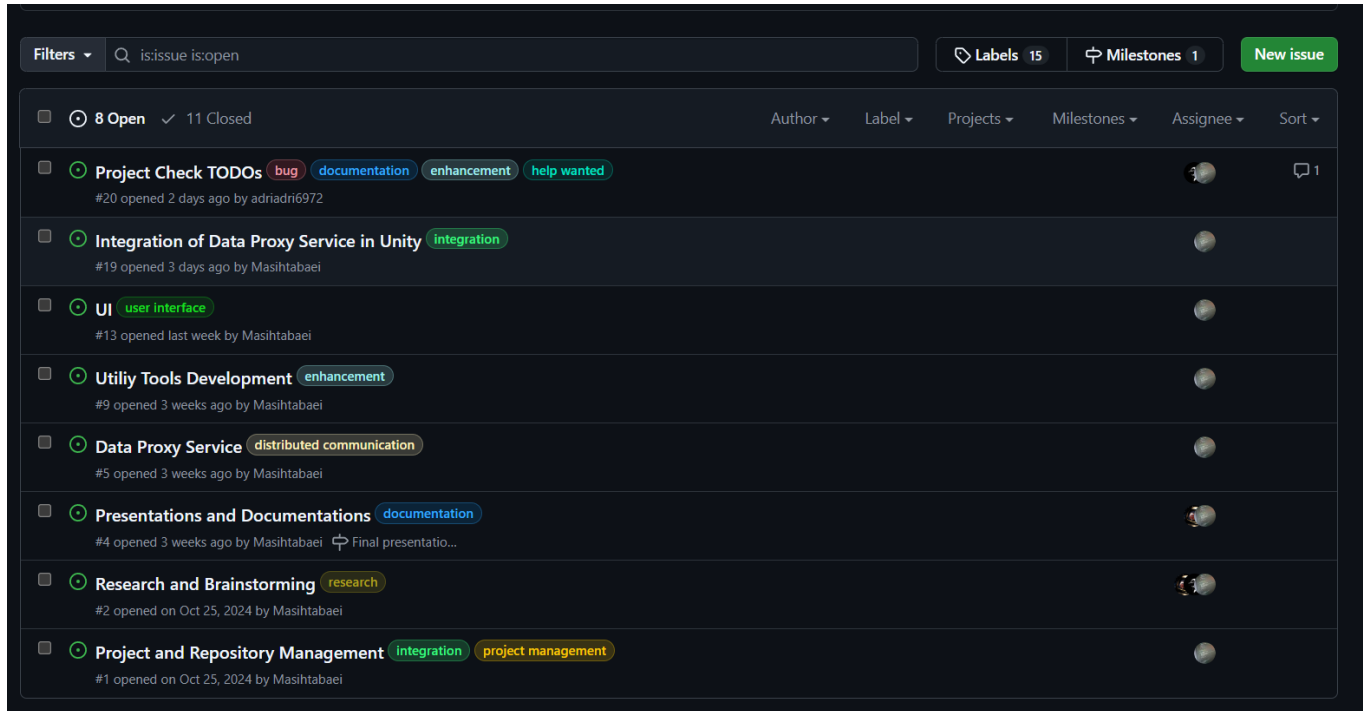


Git*



GitHub*

- Issues with labels
- Milestones
- Branches
- Wiki
- And many more ...



Source: Self-captured

Source: <https://simpleicons.org/>



EarthSync: Tasks Accomplished

Adding rain effect in Unity



Adding snow effect in Unity



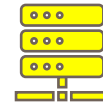
Adding future scenarios



Extending the user interface



Finishing implementation of the Python proxy server



Integration into Unity



Test and Delivery



EarthSync: Environment Generation



Google Earth



Blender

Source: <https://simpleicons.org/>



Veste*

Vertices: 1.35mio

Triangles: 2.25mio

Lat., Long.: 50.265, 10.972
50.259, 10.985



University*

Vertices: 949k

Triangles: 1.58mio

Lat., Long.: 50.268, 10.946
50.262, 10.956



Marketplace*

Vertices: 1.13mio

Triangles: 1.88mio

Lat., Long.: 50.260, 10.956
50.255, 10.969

Google Earth API

- Mesh generation with Google Maps Elevation API
- Texturing with Google Maps Static API
- Migration into Unity with C# scripts

* Source: Self-captured



EarthSync Data: Where?

Multiple Weather Data Sources Inspected

Documentation used

+

Application programming interface (API) inspected using their playgrounds, Postman API or self-written Python scripts

Open-Meteo

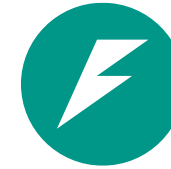
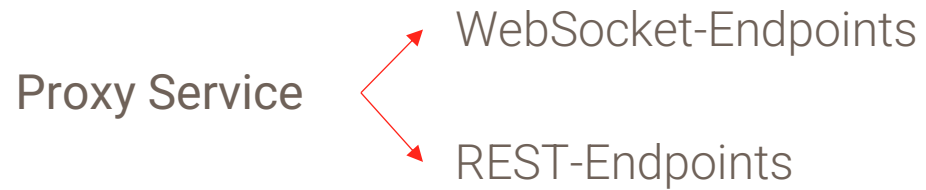
~~Tomorrow AI~~

~~OpenWeather~~

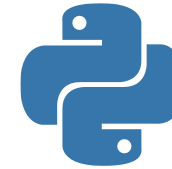
~~Deutscher Wetterdienst~~



EarthSync Data: How?



FastAPI



Python 3

Source: <https://simpleicons.org/>

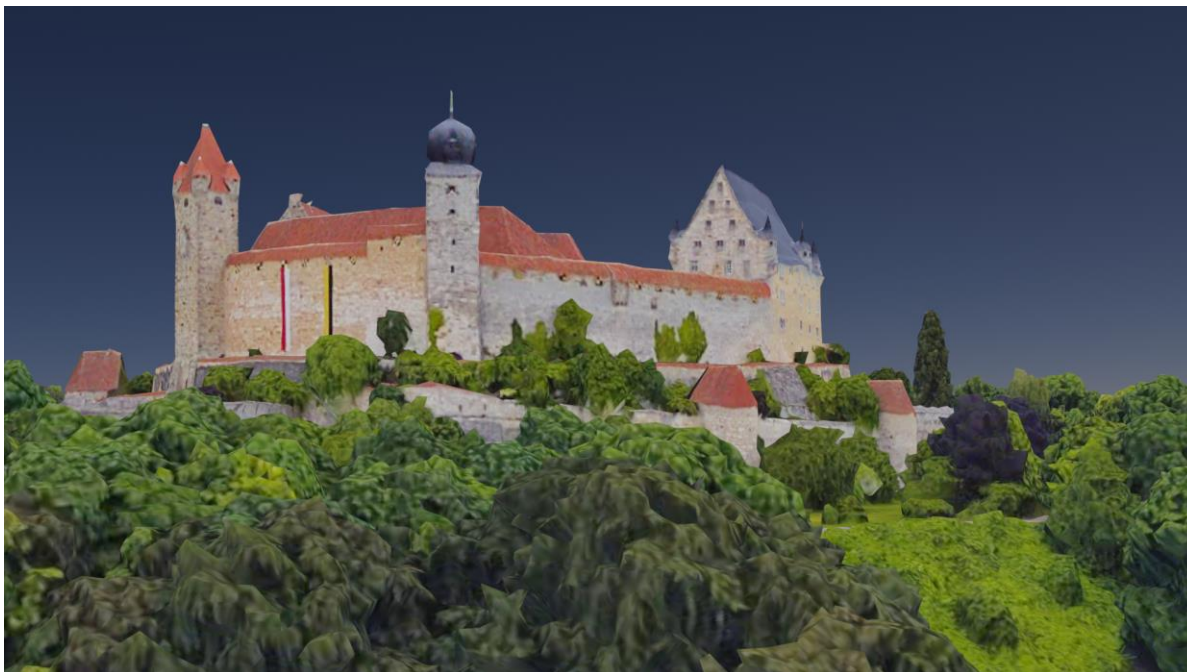


Each 15 seconds a new update

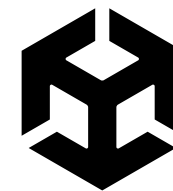
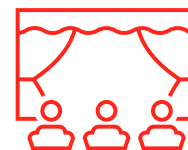
Persistent connection



EarthSync in Action: Live-Demo



Self-captured



Unity 3D

Source: <https://simpleicons.org/>





Echoes of EarthSync

Your Questions and Reflections



Coburg University of Applied Sciences and Arts

Thank you for syncing with EarthSync!

www.hs-coburg.de