

New Approaches for 3D Web GIS Applications in Cultural Heritage

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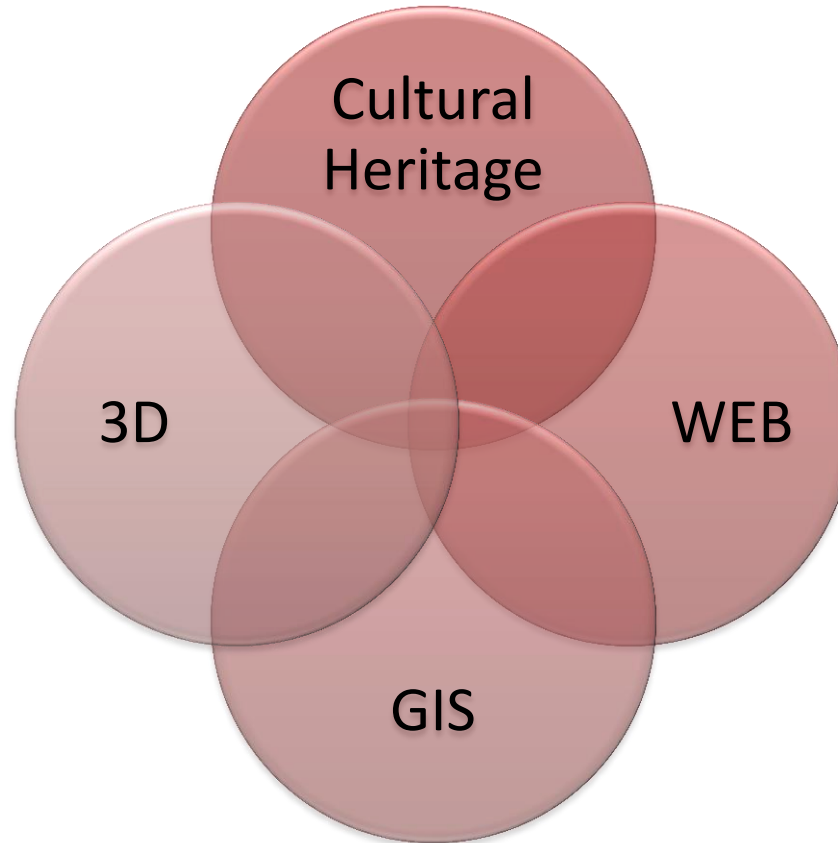
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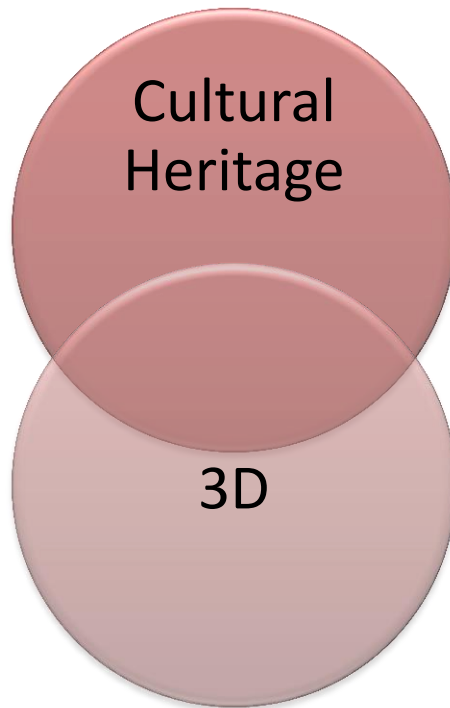
Agenda

- Research Areas in the scope of 3D Web GIS and Cultural Heritage
- Two approaches used in MayaArch3D
 - Approaches for Data Handling especially combining LoD, Hierarchical Semantic Segmentation and Database Separation
 - Approaches for 3D Analysis in CH Web GIS Applications

Research Areas



Characteristics



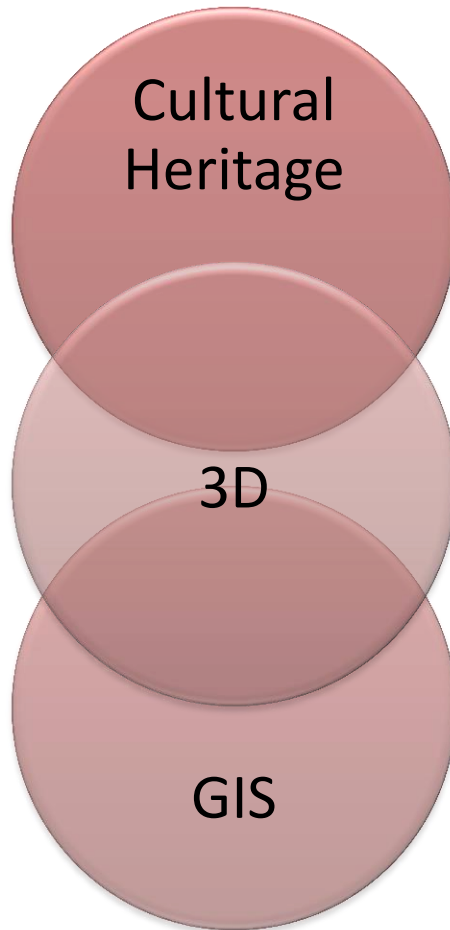
BIG amount of data

Heterogeneous types of data

Varying spatial extent of data

Multiple Representations of data

Characteristics



BIG amount of data

Heterogeneous types of data

Varying spatial extent of data

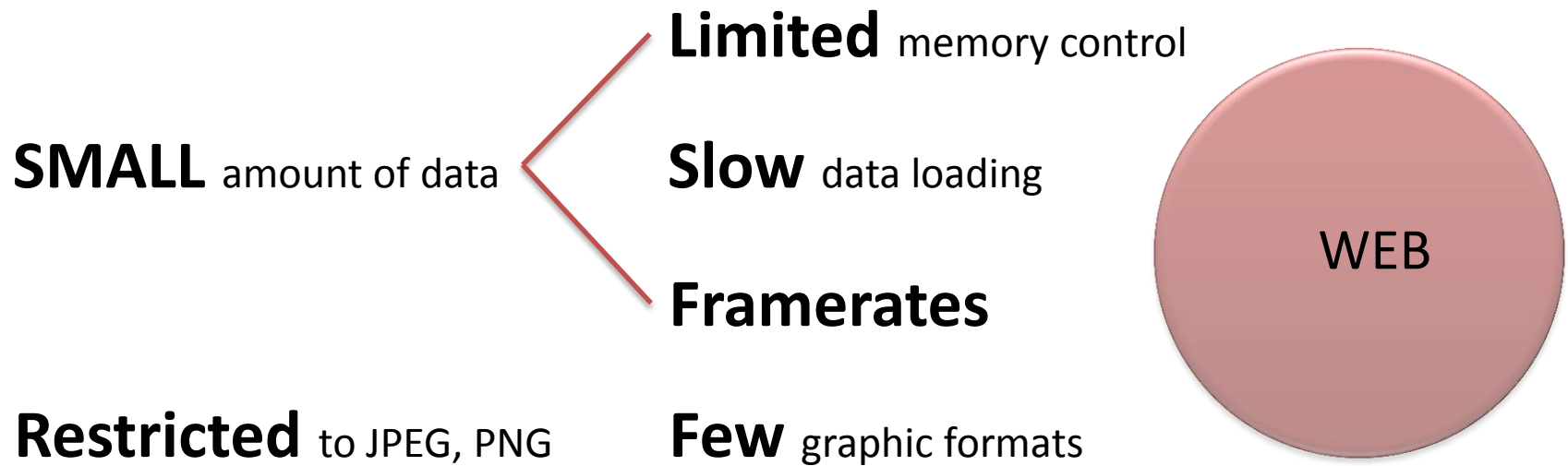
Multiple Representations of data

more Heterogeneous types of data

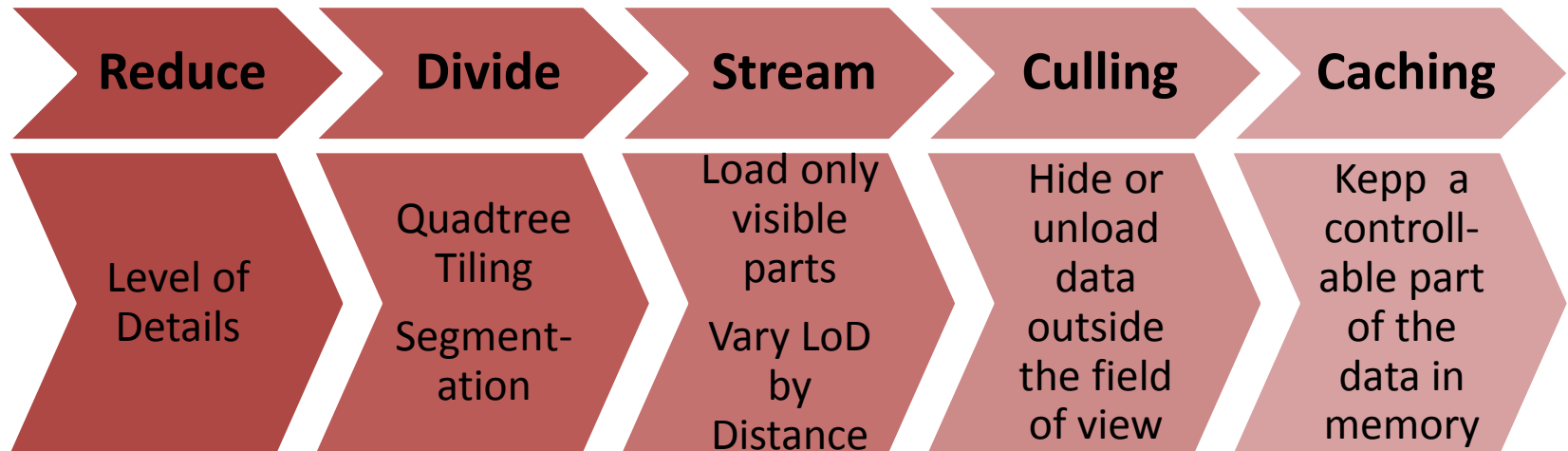
Vector, Raster, Geodatabase, OGC-Services and -Formats

Georeferenced data

Characteristics

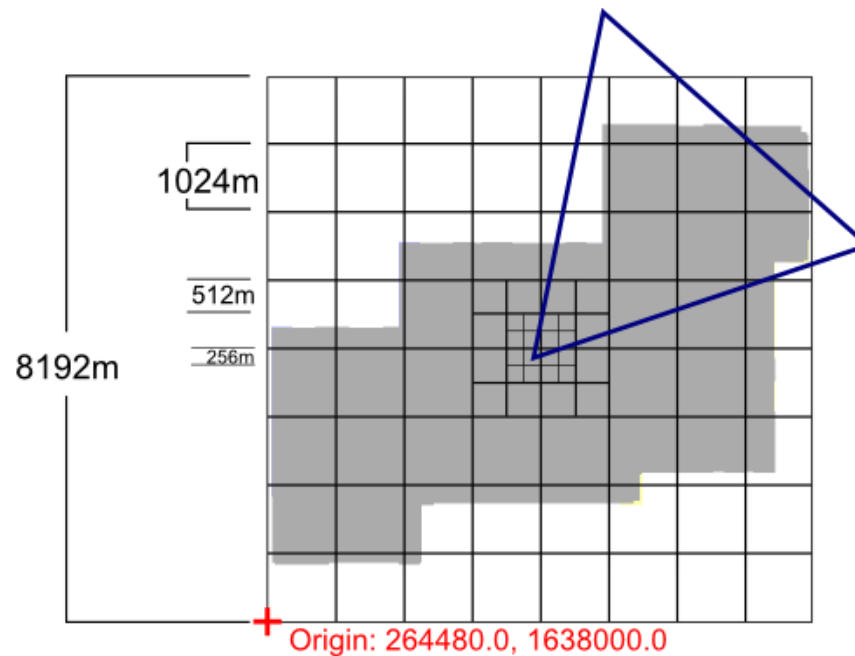


Approaches for Data Handling



Make all the data available but load and show only what is needed!

Level of Detail-Quadtree-Tiling



LOD1: 60.000 cut into 64 tiles of 1024x1024m
LOD2: 120.000 cut into 64*4 tiles of 512m²
LOD3: 240.000 cut into 64*4*4 tiles of 256m²
LOD4: 480.000 cut into 64*4*4*4 tiles of 128m²

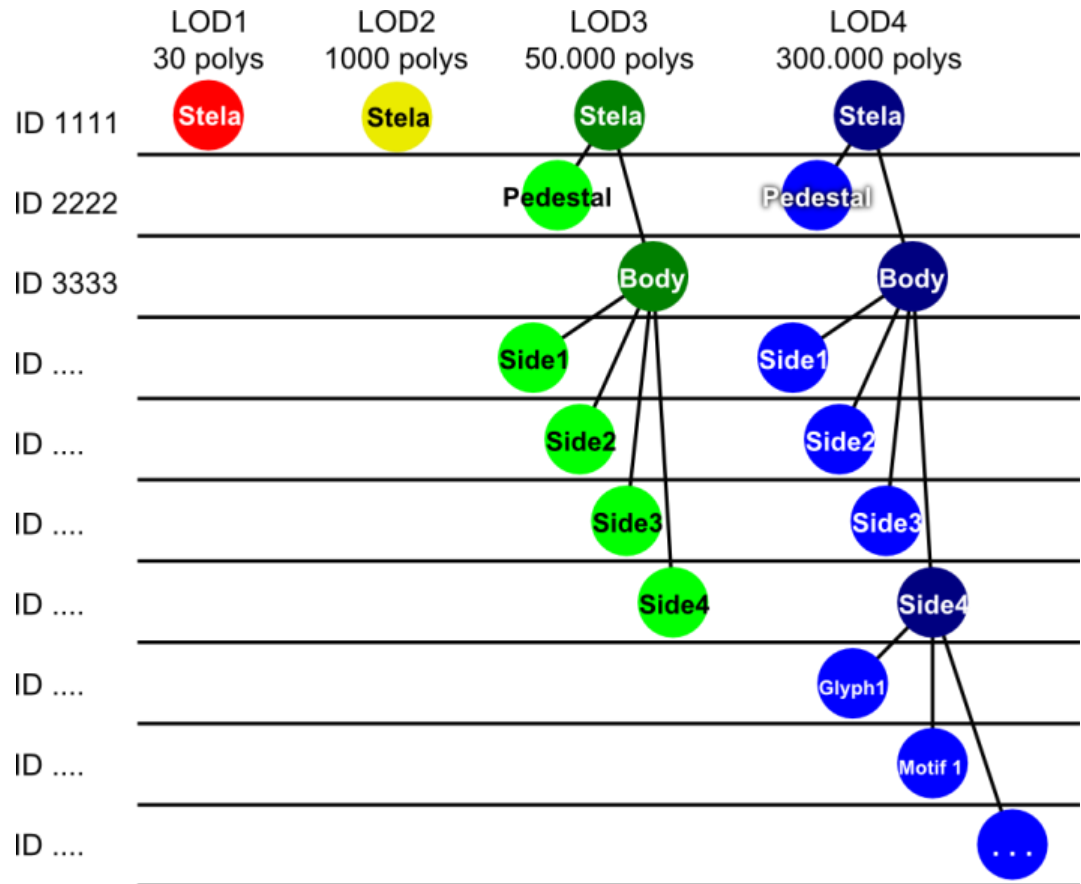
Hierarchical Semantic Segmentation, Multiresolution, Multiple Representations & Seperated Databases

Ontology of Objects

LoDs and

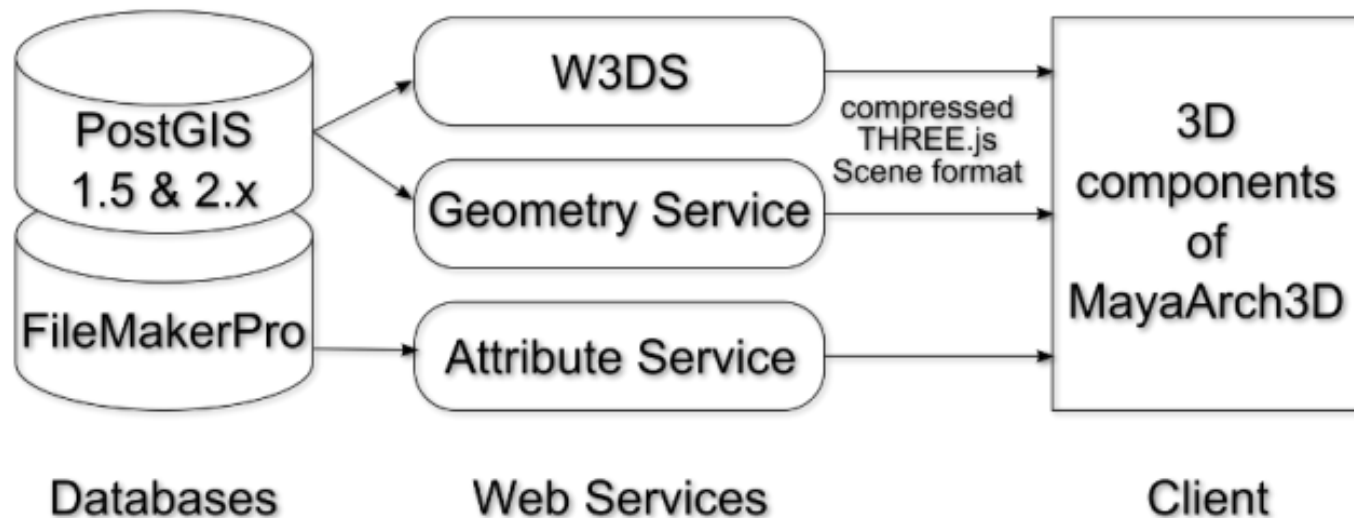
other **Representations**

share **one ID**

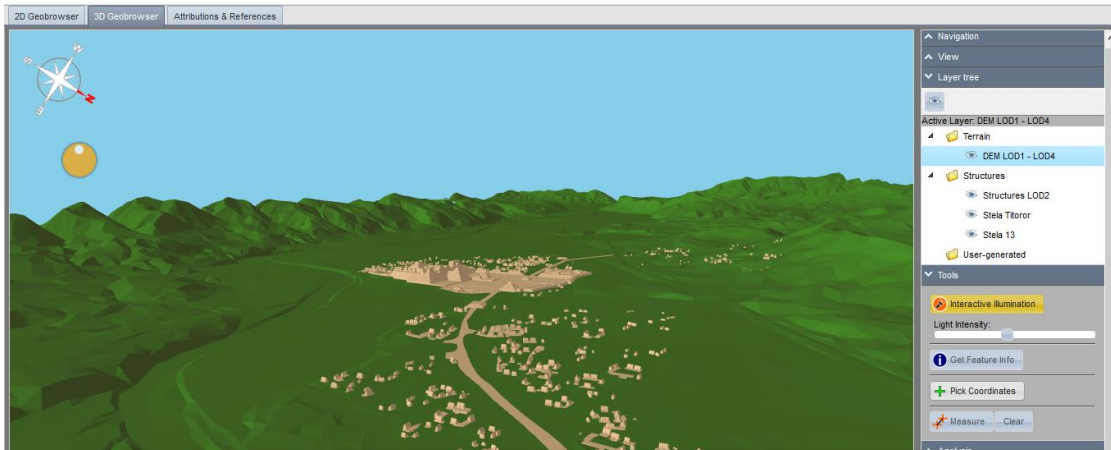


Source: Auer, Agugiaro, Billen, Loos, Zipf (2014)

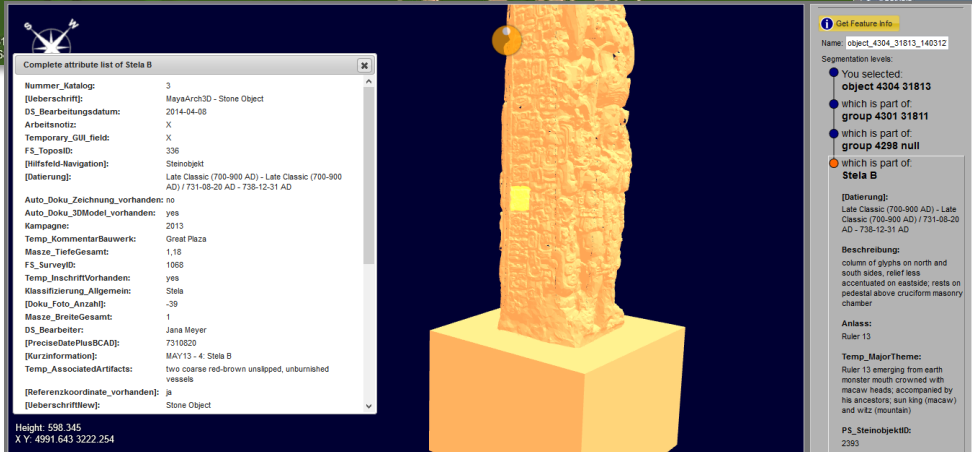
Hierarchical Semantic Segmentation, Multiresolution, Multiple Representations & Seperated Databases



Hierarchical Semantic Segmentation, Multiresolution, Multiple Representations & Seperated Databases



MayaArch3D Scene Viewer
for georeferenced data

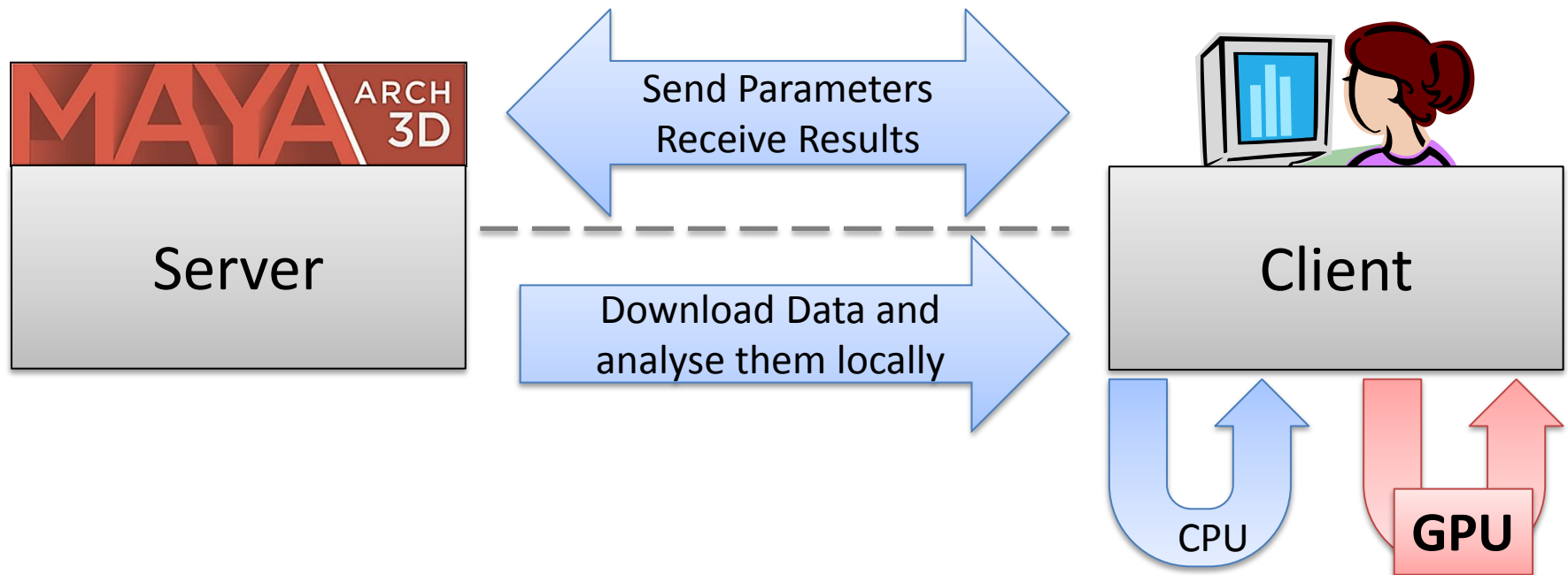


MayaArch3D Single Object Viewer



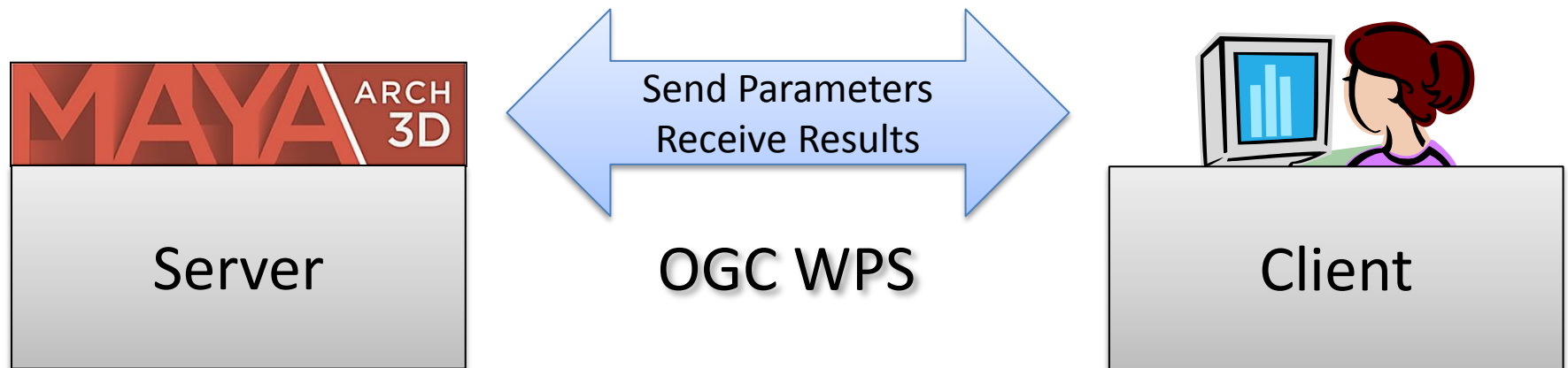
Approaches for 3D Analysis in Cultural Heritage Web GIS

Where is the data?



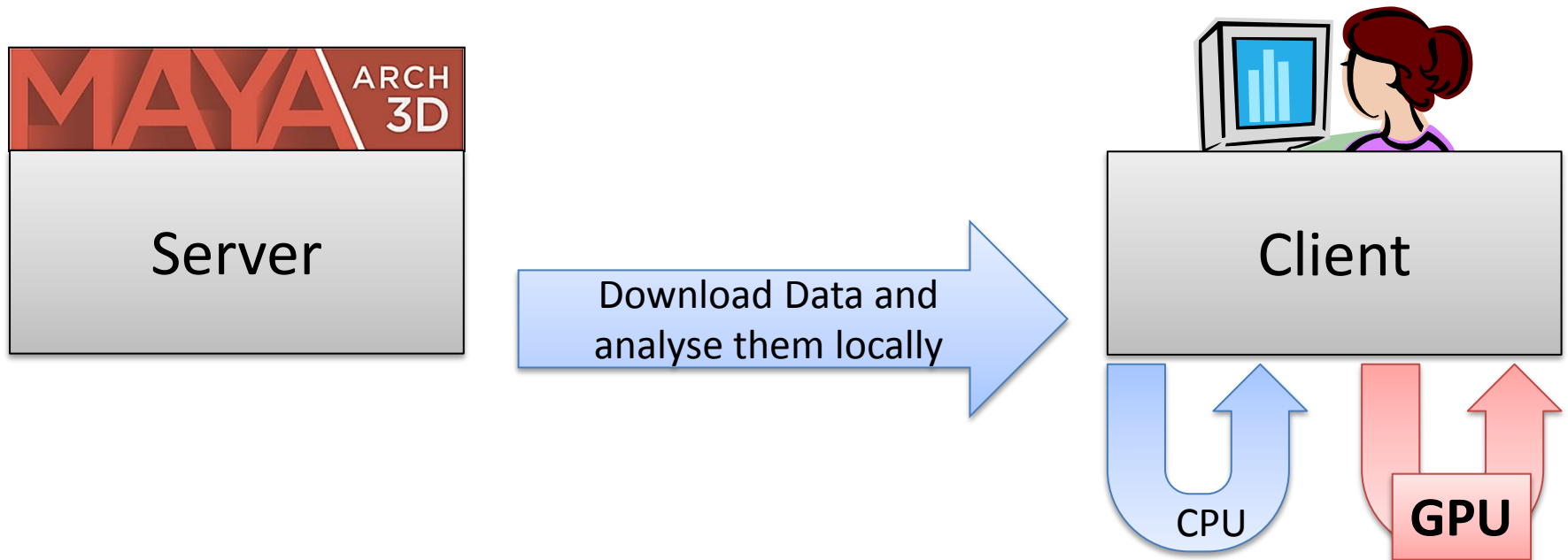
Approaches for 3D Analysis in Cultural Heritage Web GIS

Server side processing



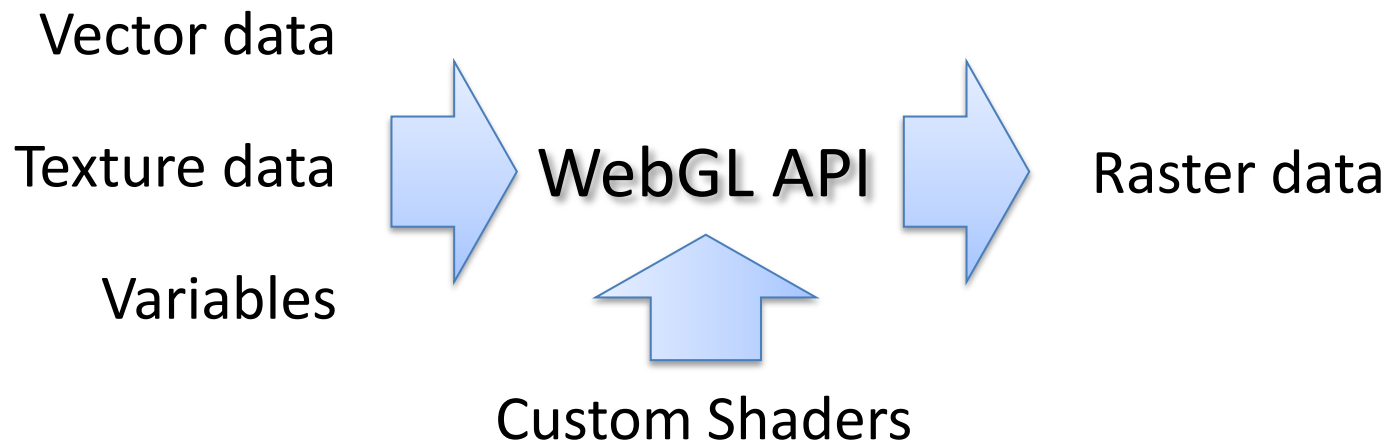
Approaches for 3D Analysis in Cultural Heritage Web GIS

Client side processing



Approaches for 3D Analysis in Cultural Heritage Web GIS

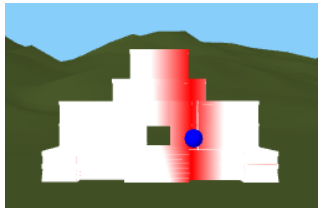
How to use the **GPU** from JavaScript?



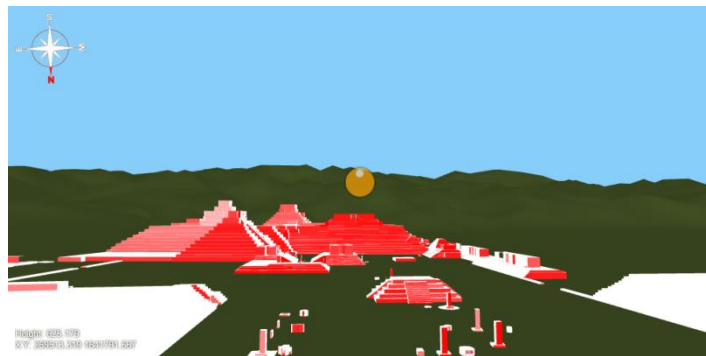
Approaches for 3D Analysis in Cultural Heritage Web GIS

Visual Analysis in real time

Feature Orientation

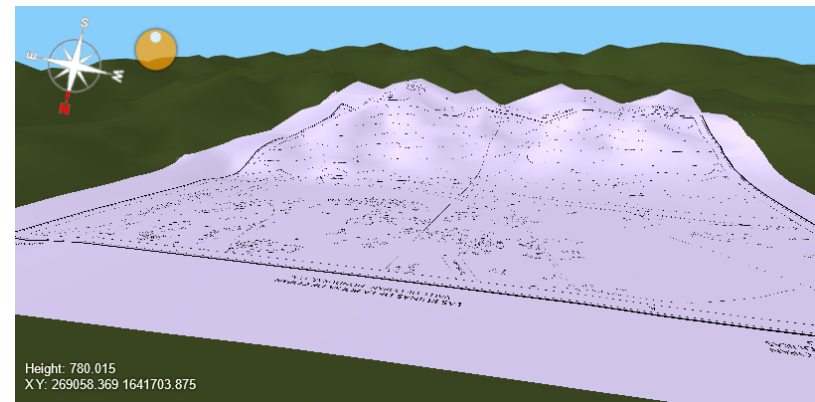


Horizontal perpendicular alignment of planes to a **point**



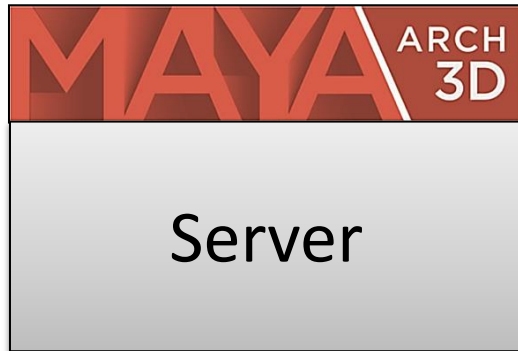
Horizontal perpendicular alignment of planes to a **compass direction**

Georeferenced, user defined raster overlay

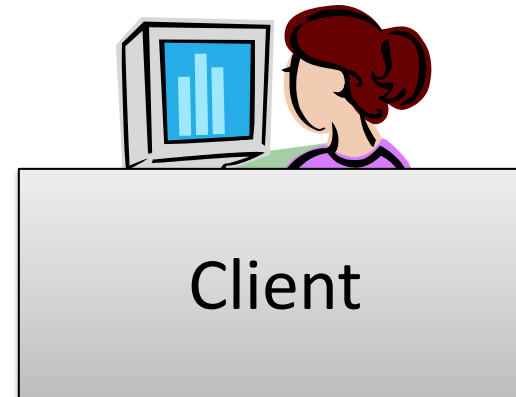


- Raster Overlay Material: no need for texture coordinates
- Only .png, .jpg + worldfile supported
- Geotiff support requires server side conversion service

The MayaArch3D Framework



Filemaker Pro
PostgreSQL / PostGIS
Geoserver (OGC WMS)
W3DS
Geometry Service
Attribute Service
pyWPS (OGC WPS)
Geomajas Server Component



THREE.js
GIScene
MA3D SingleObject and Scene Viewer
Geomajas WebGIS Geobrowser

Thank you for your Attention!