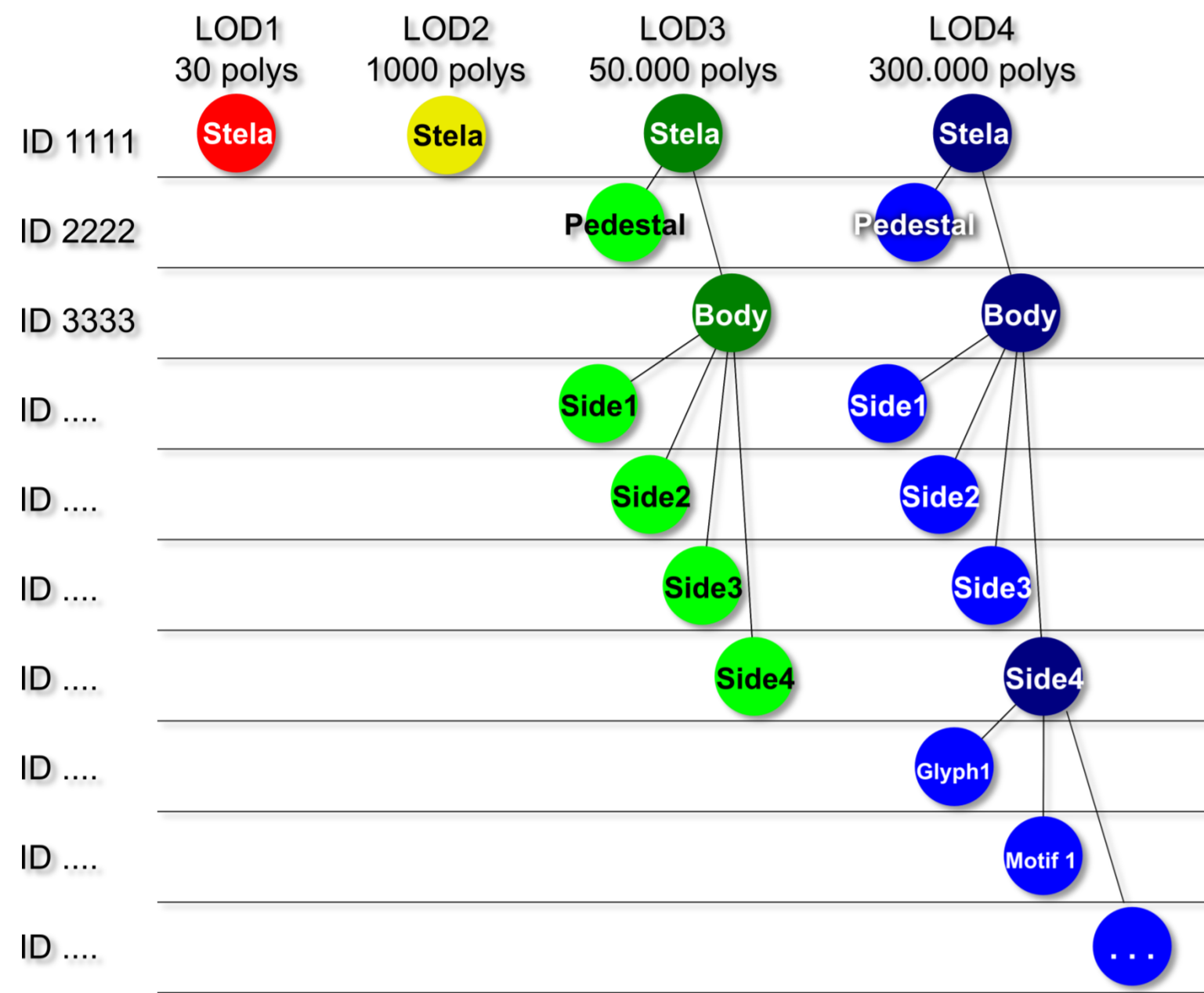


# Web-based Visualization and Query of semantically segmented multiresolution 3D Models in the Field of Cultural Heritage

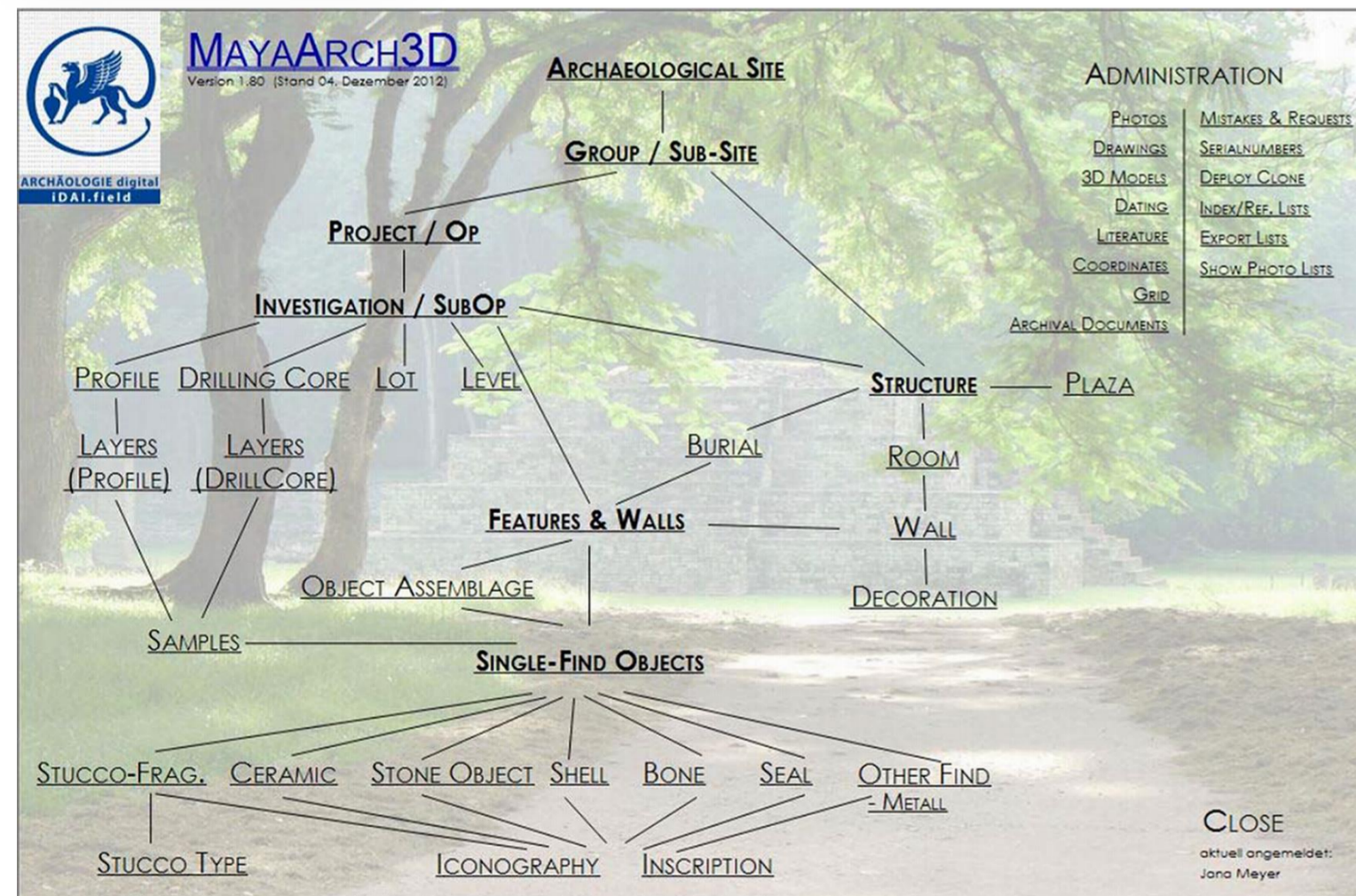
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The MayaArch3D project aims to realize a web-based archaeological research platform bringing spatial and non-spatial databases together and providing visualization and analysis tools. Especially the 3D components of the platform use hierarchical segmentation concepts to structure the data and to perform queries on semantic entities.

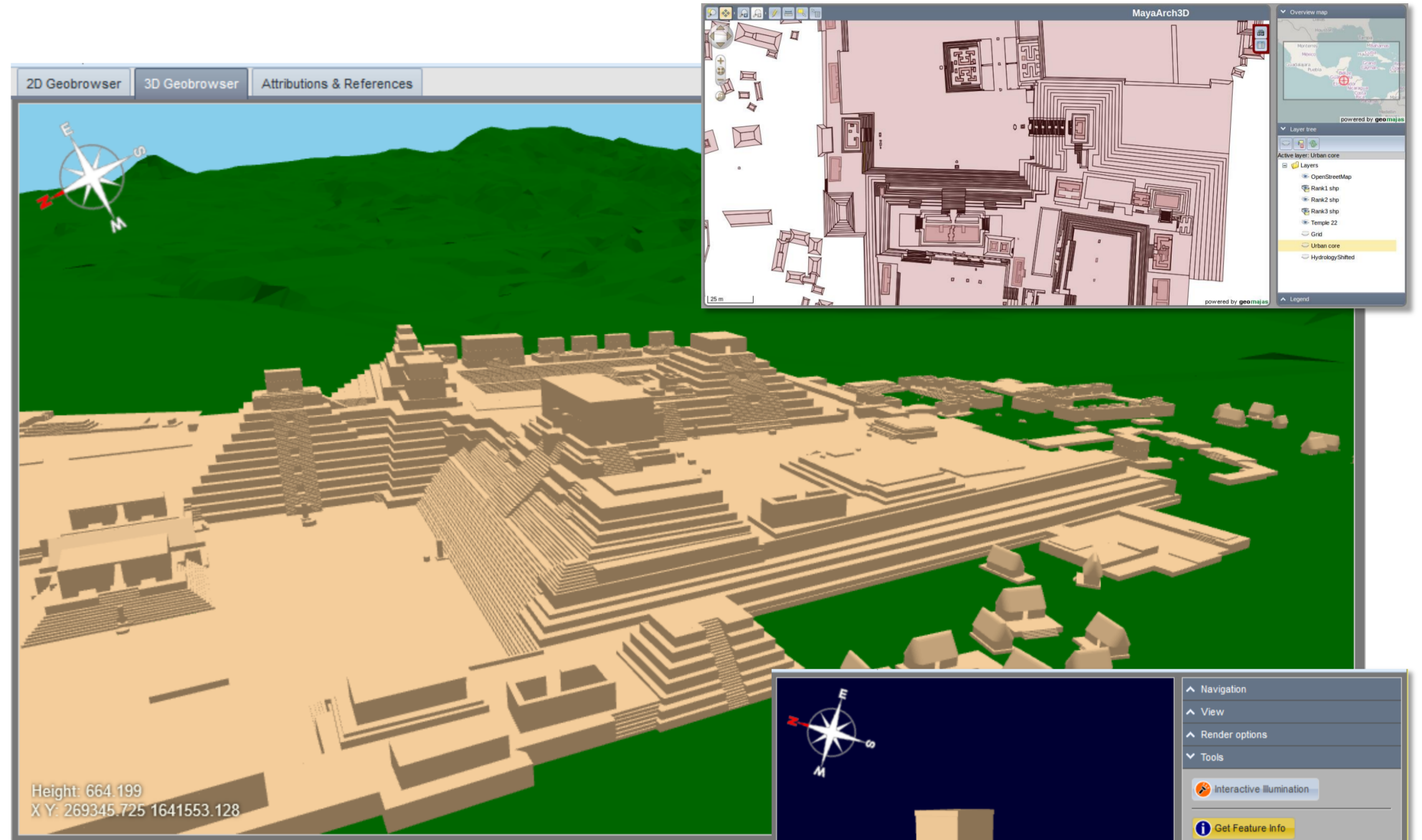


Geodatabase structure to store multiple resolutions of semantically segmented models

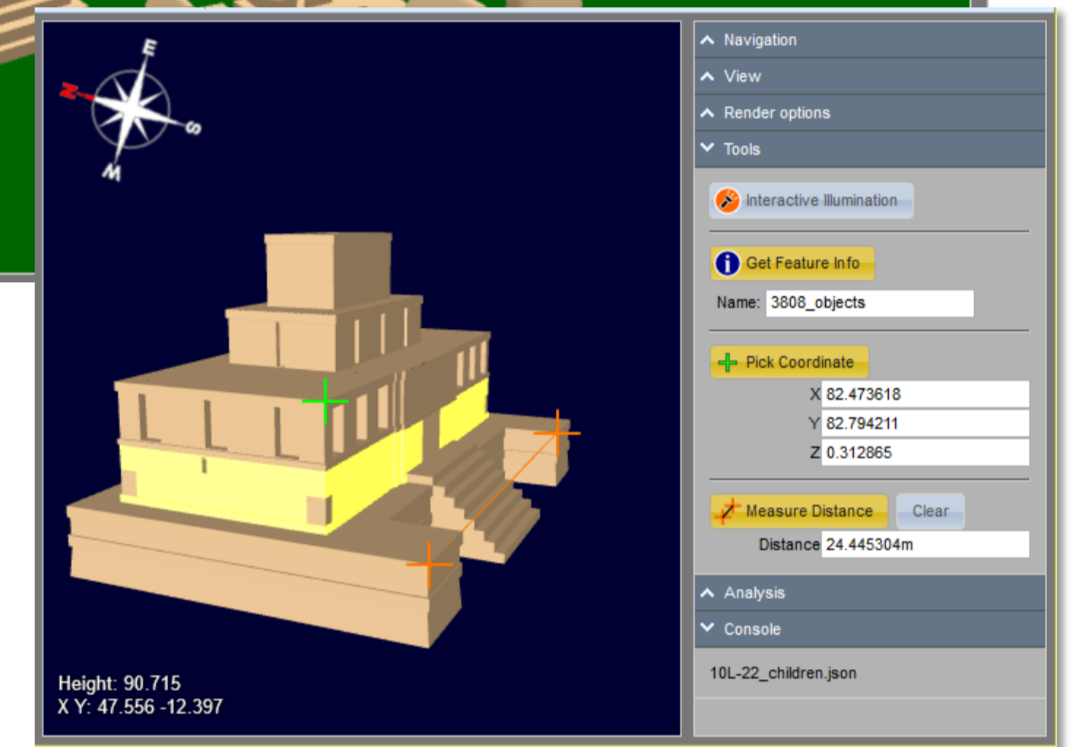
The geospatial database uses ontologies of "part-of"-relations to store semantically segmented 3D models. These ontologies have been defined for different Maya architecture types, e.g. Temples, Stelas, Altars and different house types. Each Object can be stored as different representation types, e.g. LoD 0 (2D), LoD 1 to 4 (3D) and arbitrary other representations, e.g. Images. Apart from that well defined database structure for georeferenced geometries, all semantic attributes are stored in another external database from the German Archaeological Institute (DAI). Both databases refer to the same semantic objects by sharing consistent IDs. The presented database configuration enables to organize and query the data by semantic, geometric and spatial properties.



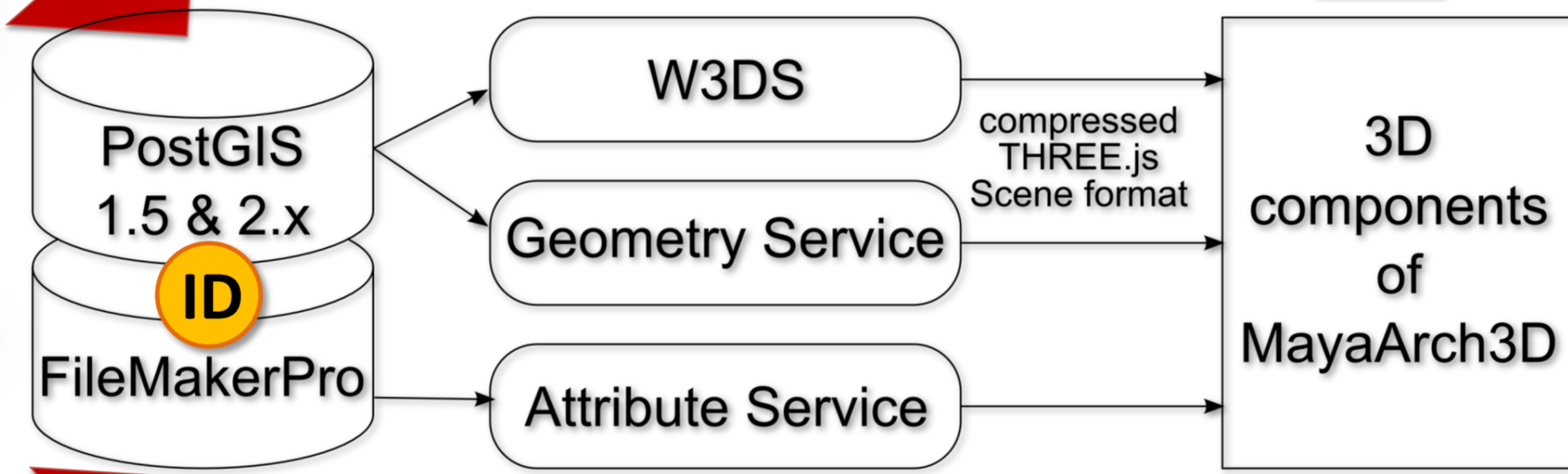
Archaeological database structure to store semantic properties



3D Scene Viewer (LoD 2)



3D Single Object Viewer (LoD 3)



Databases

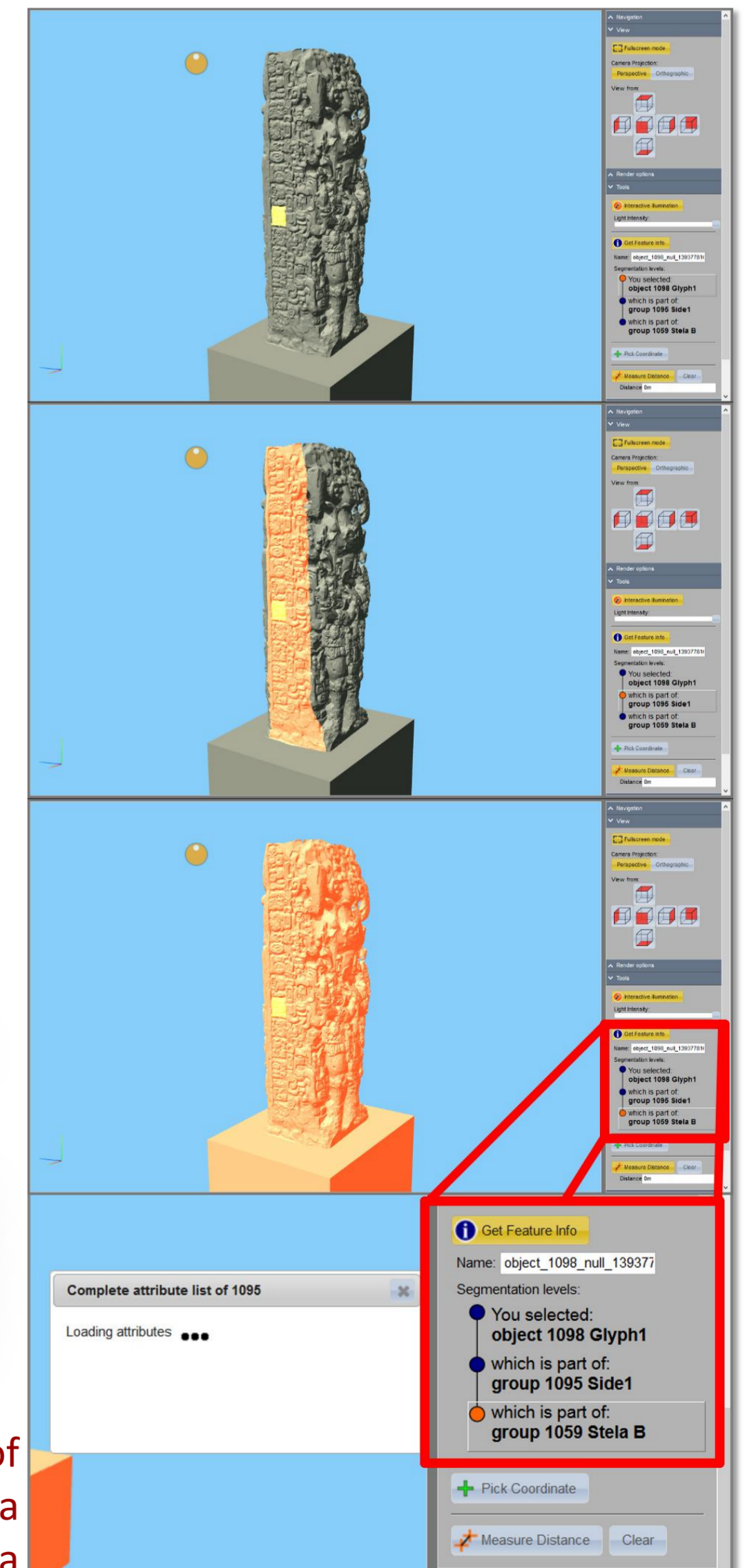
Web Services

Client

Geometric and semantic information is transferred to the client application using three different services. Semantically segmented models can be queried using spatial criteria or IDs. The corresponding archaeological attributes are delivered through the Attribute Service by ID. The Web3DS Service (W3DS) – a standardization candidate of the OpenGeospatial Consortium (OGC) – is used for spatial queries, while the Geometry Service performs queries by ID. Both services can deliver 3D scenes in different LoDs and use a web friendly format for WebGL rendering (JSON).

A generic user interface uses the segments as navigation metaphor to browse and query the semantic segmentation levels and retrieve information from an external database of the German Archaeological Institute (DAI).

Interactive query of segmentation levels of a manually segmented Stela



3D Single Object Viewer (Lod 4)