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1 MayaArch3D Project Documentation

1.1 Admin User

1.1.1 Admin User Dokumentation- LDAP

1.1.1.1 LDAP Management with GUI: phpLDAPadmin

Access http://mayaarch3d.org/phpldapadmin/

1.1.1.2 LDAP Management with GUI: JXplorer

1.1.2 Geoserver Access

1.1.2.1 What is Geoserver? GeoServer is an open source server for sharing geospatial data. Designed for interoperability, it publishes data from any major spatial data source using open standards.

Geoserver Project Page: http://geoserver.org/

General Geoserver User Documentation: http://docs.geoserver.org/2.6.x/en/user/
1.1.2.2 The MayaArch3D Geoserver In the MayaArch3D-project for the 2D and 3D WebGIS/Geobrowser, the data is retrieved from the Geoserver via OGC WMS and OGC WFS. Note: Some data is also retrieved from self-implemented services: GeometryService, AttributeService and ImageService or is directly configured in the Geomajas Config to be loaded directly from the PostgreSQL/PostGIS Database or from Shapefiles/Geotiffs.

Installed Version on 2015-09-26 was: Geoserver 2.6.0 in an Apache Tomcat Servlet Container

Apache Tomcat Server Information

<table>
<thead>
<tr>
<th>Tomcat Version</th>
<th>JVM Version</th>
<th>JVM Vendor</th>
<th>OS Name</th>
<th>OS Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apache Tomcat/7.0.26</td>
<td>1.7.0_79-b14</td>
<td>Oracle Corporation</td>
<td>Linux</td>
<td>3.13.0-73-g</td>
</tr>
</tbody>
</table>

Web Access:

- Tomcat: http://www.mayaarch3d.org:8080
Geoserver:

- Web interface for Configuration and Data Management: http://www.mayaarch3d.org:8080/geoserver/web
- WMS Base URL: http://www.mayaarch3d.org:8080/geoserver/wms
- WMS Capabilities: http://www.mayaarch3d.org:8080/geoserver/wms?REQUEST=GetCapabilities
- Apache Web Server Rewrite Proxy URL: Instead of using the longer and ugly URL with port:8080 a short alias URL is defined in the Apache Service Config file (\etc\init.d\apache2\sites-available\default).

All URLs starting with http://www.mayaarch3d.org:8080/geoserver can be replaced by starting them with http://www.mayaarch3d.org/geoserver

1.1.2.2.1 Authentication (How to log-in)  The Geoserver is configured to use either the default Username/Password-Authentication OR the MayaArch3D-LDAP Server for Authentication. Depending on the LDAP Role the Users have different possibilities to manage the Geoserver. To add, configure or delete Layers you must be member of the LDAP admin-group which is mapped to the Geoserver ADMIN-group. To have more possibilities than just managing the data in the geoserver, like the configuration of the Geoserver itself, its security policy, caching etc. you must have an extra default geoserver User/Password Account (see Geoserver general admin password).

1.1.2.2.2 Geoserver general admin password

General Admin Password geoserver-admin : GeoSrvMayaAdmin

Geoserver Masterpassword (see Geoserver User Manual) $rrfd$4§!

1.1.3 3D DB - Structure Hierarchy Viewer and Segmented Model Builder

This is a web based tool which can retrieve tree structured data from the MayaArch3D 3D-database "structures"-table and visualized it as an interactive collapsable tree.

Further this tool can be used to create a THREE-JSON Scene file (version 3) by retrieving the hierarchy from the database while the user adds THREE-JSON-Object files which the tool integrates at the appropriate point. When finished with all steps the user can export (save) the THREE-Scene file to his
hard disk. This can then be further used for web display with the MayaArch3D-
SingleObjectViewer.

WebAccess:
URL: [http://www.mayaarch3d.org/dev/ldaptest/singleObjectViewer/db-tree/](http://www.mayaarch3d.org/dev/ldaptest/singleObjectViewer/db-tree/)

1.1.3.1 How to view the current hierarchy of structures stored in the
MayaArch3D 3D database?

1. Enter a structure name or if known enter directly a structure id.
2. Press "Show Structure Tree"
3. Explore the structure by clicking on the red/white circles to open or close
child entities.
4. You can also pan the view by holding the left mouse button and zoom
in/out using the scrollwheel.

1.1.3.2 How to create a hierarchically segmented model to be shown
in the MayaArch3D SingleObjectViewer?

1. Define the model structure (hierarchy)
   (a) Have a look at the classes table and the definition of possible hierar-
chies for the segmentation process.
   (b) Define the segmentation hierarchy as new entries in the structure
table in the 3D database and enter the filemaker_ids accordingly.
   (c) Check the structure with this tool.
2. Prepare the data
   (a) Segment your model into the smallest pieces of your previously defined
structure (see 1.2)
   (b) Save the segments with their filemaker_id as file names, for later
association. If available (e.g. Blender Plugin) save your Model in
THREE-JSON Format 3.1. You can also save your models as OBJ-
Files and use the python converter from three.js convert_obj_three.py.
3. Associate model segments to the hierarchy
   (a) Open this tool and display your structure. Unfold all nodes. You will
have to associate all "leaf"-nodes later with the file prepared earlier.
(b) Click "Create Model" and choose all files from your local file system to associate the model to the hierarchy.

(c) Click "Save Model". Put the resulting model file and all textures of the segments into a location of a webserver.

If the webserver's domain is not www.mayaarch3d.org, it should support "CORS" so that you can view the model under the following URL OR you have to install the SingleObjectViewer on your own domain:

http://www.mayaarch3d.org/dev/examples/singleObjectViewer/sov.html?url=<<Enter Model URL here!!>>&format=scene&georef=false&verticalAxis=Y&segmented=true

1.2 Developer

1.2.1 FM Copy Service, PostgreSQL/PostGIS

The FM Copy Service is actually a Java application that is run in a cronjob to regularly update the FilemakerCopy DB. It will find out about all existing tables in the FilemakerPro-based MayaArch3D archaeological database in DAIs iDAI.Field. After finding out all tables it will copy them to a Postgres DB named FMCopy, which is used for queries in the 2D GeoBrowsers QueryBuilder.

1.2.2 System Architecture

![System Architecture Diagram](image)

Figure 2: System architecture

1.2.2.1 Overview
1.2.2.2 User Management with LDAP

Installation:

Package slapd (OpenLDAP-Server)

Host 195.37.175.47 (www.mayaarch3d.org)

Port 389

Install Directories /etc/ldap

Access see Admin User Dokumentation- LDAP

1.2.2.3 Databases

- All following databases run on the same database cluster with port 5432

- Existing login roles:
  - dsoeder
  - ffecher
  - gagugiaro
  - geometrYServiCE
  - hrissetto
  - jschwerin
  - lloos
  - lstelson
  - maya POSTGRES SUPERUSER
  - maya_reader Can be used for webservices that only need to read the database.
  - mayaw3dsadmin
  - mlyons
  - nbillen
  - postgres
  - sensoruser

1.2.2.3.1 2D GeoDB for vector data (PostgreSQL/PostGIS)

database name maya2d

schemata public

PostgreSQL version "PostgreSQL 9.2.4 on x86_64-unknown-linux-gnu, compiled by gcc (Ubuntu/Linaro 4.6.3-1ubuntu5) 4.6.3, 64-bit"

PostGIS version "POSTGIS="1.5.8" GEOS="3.4.2-CAPI-1.8.2 r3921" PROJ="Rel. 4.8.0, 6 March 2012" LIBXML="2.7.8" USE_STATS"
1.2.2.3.2 3D GeoDB for Structures (PostgreSQL/PostGIS)

database name maya3d

extensions
- jdbc_fdw postgres Foreign data wrapper for querying JDBC
- plpgsql postgres PL/pgSQL procedural language
- postgis postgres PostGIS geometry, geography, and raster spatial types and functions
- postgis_topology postgres PostGIS topology spatial types and functions
- postgres_fdw postgres foreign-data wrapper for remote PostgreSQL servers

schemata
- copan postgres
- copan_new gagugiaro currently used
- ext_tables postgres
- public postgres standard public schema
- temp postgres
- topology postgres
- worka gagugiaro

PostgreSQL version "PostgreSQL 9.2.4 on x86_64-unknown-linux-gnu, compiled by gcc (Ubuntu/Linaro 4.6.3-1ubuntu5) 4.6.3, 64-bit"

PostGIS version "POSTGIS="2.1.0 r11822" GEOS="3.4.2-CAPL-1.8.2 r3921" PROJ="Rel. 4.8.0, 6 March 2012" GDAL="GDAL 1.10.0, released 2013/04/24" LIBXML="2.7.8" TOPOLOGY RASTER"

1.2.2.3.3 3D GeoDB for W3DS Terrain Tiles (PostgreSQL/PostGIS)

database name maya3d_w3ds_tiles

schemata public

PostgreSQL version "PostgreSQL 9.2.4 on x86_64-unknown-linux-gnu, compiled by gcc (Ubuntu/Linaro 4.6.3-1ubuntu5) 4.6.3, 64-bit"

PostGIS version "POSTGIS="1.5.8" GEOS="3.4.2-CAPL-1.8.2 r3921" PROJ="Rel. 4.8.0, 6 March 2012" LIBXML="2.7.8" USE_STATS"
1.2.2.3.4 FilemakerCopy DB for archaeological data and attributes

database name: FMCopy

schemata: public

PostgreSQL version: "PostgreSQL 9.2.4 on x86_64-unknown-linux-gnu, compiled by gcc (Ubuntu/Linaro 4.6.3-1ubuntu5) 4.6.3, 64-bit"

PostGIS version: "POSTGIS="1.5.8" GEOS="3.4.2-CAPI-1.8.2 r3921" PROJ="Rel. 4.8.0, 6 March 2012" LIBXML="2.7.8" USE_STATS"

1.2.2.3.5 iDAIL.Field FilemakerPro Archaeological DB of the DAI. Based on FilemakerPro. This is a database system used to maintain data from several DAI-projects. One of them is this MayaArch3D-projekt DB. For access ask the DAI-IT stuff or Jennifer von Schwerin.

1.2.2.4 Services

1.2.2.4.1 Apache 2 Webserver General: Serves as Proxy for several services to have nice URLs and also to use the same LDAP Authentication Realm. Implements CORS (cross-origin-resource-sharing) to share services from different domains. Secures data directories:

- /var/www/protected: access only with LDAP account (all groups/security levels)
- /var/www/published: free access, but restricted to be requested from the referer www.mayaarch3d.org

Installation:

Package: apache2

Port: 80

Config: /etc/apache2/sites-available/default

Config text:

```<VirtualHost *:80>
ServerAdmin webmaster@localhost

DocumentRoot /var/www```
#enable gzipped json delivery
AddOutputFilterByType DEFLATE application/json
AddOutputFilterByType DEFLATE application/javascript
AddOutputFilterByType DEFLATE text/plain
AddOutputFilterByType DEFLATE text/html
AddOutputFilterByType DEFLATE text/xml
AddOutputFilterByType DEFLATE text/css
AddOutputFilterByType DEFLATE model/threejs

<FilesMatch ".*/(dds)$">
    SetOutputFilter DEFLATE
</FilesMatch>

#enable CORS Cross origin resource sharing according to

#only if geometrieservice, w3ds or /dev folder is requested

#SetEnvIf Request_URI ^/(.*)(/gs/|/w3ds/)(.*)$ geometrieservice
#Header set Access-Control-Allow-Origin * env=geometrieservice
#Header set Access-Control-Allow-Headers "Authorization, CONTENT-TYPE, x-requested-with"

#Rewriterules
RewriteEngine on

#RewriteRule ^/(.*)(/gs/|/w3ds/)(.*)$ http://129.206.66.244:8081/geometrieservice-0.0.1-SNAPSHOT/geometrieservice$1 [P]
RewriteRule ^/(.*)(/gs_new/)(.*)$ http://localhost:8084/geometrieservice/geometrieservice$1 [P]
RewriteRule ^/(.*)$ http://localhost:8080/geometrieservice$1 [P]
RewriteRule ^/(.*)$ http://localhost:8080/geometryservice/geometryservice$1 [P]
RewriteRule ^/as(.*$ http://localhost:8084/attributeservice/attributeservice$1 [P]
RewriteRule ^/w3ds(.*$ http://rax.geog.uni-heidelberg.de/w3dsmayaarch3D/W3DS$1 [P]
RewriteRule ^/w3ds(.*$ http://baru.geog.uni-heidelberg.de:8080/w3dsmayaarch3D/W3DS$1 [P]
RewriteRule ^/geoserver(.*$ http://localhost:8080/geoserver$1 [P]
RewriteRule ^/webgis(.*$ http://localhost:9999$1 [P]
RewriteRule ^/imageservice(.*$ http://elpital.geog.uni-heidelberg.de:8084/imageservice$1 [P]

#allow only acces if file is accessed via website (Header has Referer)
RewriteCond %{REQUEST_URI} ^/(.*)(/published/.*$)
RewriteCond %{HTTP_REFERER} !^http://(www)?\..mayaarch3d\.(org|net)/(.*$)
RewriteRule ^ - [F]
<Proxy *>
  Order allow,deny
  Allow from all
  #Deny from 129.206.91.77 #Pascal
  #Deny from 193.196.64.2 #Karlsruhe
</Proxy>

# Set CORS Headers for secured resources to be accessed with Authorization-header and preflight (OPTIONS) Request
<LocationMatch "/(dev|gs|as|imageservice|w3ds|geoserver|protected)/">
  SetEnvIf Origin "^(.*)" ORIGIN=$1
  <Limit GET POST OPTIONS HEAD>
  Header unset Access-Control-Allow-Origin
  Header always set Access-Control-Allow-Origin "%{ORIGIN}e" env=ORIGIN
  Header unset Access-Control-Allow-Credentials
  Header always set Access-Control-Allow-Credentials: true
  </Limit>
  #<Limit OPTIONS>
  Header unset Access-Control-Allow-Headers
  Header always set Access-Control-Allow-Headers "Origin, Accept, Authorization, Content-Type, X-Requested-With"
  Header unset Access-Control-Allow-Methods
  Header always set Access-Control-Allow-Methods "OPTIONS, HEAD, GET, POST"
</Limit>
</LocationMatch>

# Set password for location /as (attributeservice) to avoid requesting password when used within single object viewer on the project site www.mayaarch3d.org
<LocationMatch "^/as/*">
  # user attributeservicereader
  SetEnvIf Referer "^.*/sov\.html.*$" singleObjectViewer
  RequestHeader set Authorization "Basic YXR0cmlidXRlc2VydmljZC1qYXNo" env=singleObjectViewer
</LocationMatch>

<Directory />
Options FollowSymLinks
AllowOverride None
</Directory>
<Directory /var/www/>
Options Indexes FollowSymLinks MultiViews
AllowOverride FileInfo
Order allow,deny
allow from all
</Directory>

<Directory /var/www/tmp_download>
  Options Indexes FollowSymLinks MultiViews
  AllowOverride FileInfo Indexes Authconfig
</Directory>

ScriptAlias /cgi-bin/ /usr/lib/cgi-bin/
<Directory "/usr/lib/cgi-bin"/
  AllowOverride None
  Options +ExecCGI -MultiViews +SymLinksIfOwnerMatch
  Order allow,deny
  Allow from all
</Directory>

ErrorLog ${APACHE_LOG_DIR}/error.log

# Possible values include: debug, info, notice, warn, error, crit,
# alert, emerg.
LogLevel warn

CustomLog ${APACHE_LOG_DIR}/access.log combined

Alias /doc/ "/usr/share/doc/"
<Directory "/usr/share/doc/"
  Options Indexes MultiViews FollowSymLinks
  AllowOverride None
  Order deny,allow
  Deny from all
  Allow from 127.0.0.0/255.0.0.0 ::1/128
</Directory>

SetEnvIf Request_URI .*/index.php.*|/resources/.*|.*\.jpg|.*\.JPG|.*\.png|.*\.PNG$ noauth=1

# <Directory "/var/www/dev/ldaptest/"
#  AuthName "Use your mayaarch3d account."
#  AuthType Basic
#  AuthBasicProvider ldap
#  AuthLDAPURL "ldap://elpital.geog.uni-heidelberg.de:389/ou=users,dc=geog,dc=uni-heidelberg,dc=de?cn?sub?(objectClass=*)"
1.2.2.4.2 Geoserver with 2D and 2.5D vector and raster data

General information [The MayaArch3D Geoserver](#)

Installation As WAR-Archive in a Tomcat 7 servlet container

Package tomcat7 tomcat7-admin

Port 8080

**GEOSERVER_DATA_DIR** /var/lib/geoserver260_data_dir (configured in
/var/lib/tomcat7/webapps/geoserver/WEB-INF/web.xml)

**ProxyURL** configured in apache webserver /etc/apache2/sites-available/default
1.2.2.4.3 Attributeservice

General information **Attribute Service**

Installation As WAR-Archive in a Tomcat 7 servlet container

Package second tomcat7 instance not as package installed, but as binaries in `home/nbillen/apache-tomcat-7.0.53`

Port 8084

**Tomcat Manager GUI** [http://elpital.geog.uni-heidelberg.de:8084/manager/](http://elpital.geog.uni-heidelberg.de:8084/manager/) (tomcat-admin:TomCat7Admin)

1.2.2.4.4 Timeservice

General information As Service not deployed. Used as Java JAR-library in geobrowser. Converts Maya Long Count into Gregorian Calendar and vice versa. See: [Time Service](#)

1.2.2.4.5 Imageservice

General information **Light table, Image Service, link to Arachne service**

Installation As WAR-Archive in a Tomcat 7 servlet container

Package second tomcat7 instance not as package installed, but as binaries in `home/nbillen/apache-tomcat-7.0.53`

Port 8084

**Tomcat Manager GUI** [http://elpital.geog.uni-heidelberg.de:8084/manager/](http://elpital.geog.uni-heidelberg.de:8084/manager/) (tomcat-admin:TomCat7Admin)

1.2.2.4.6 Geometryservice

General information **Geometry Service**

Installation As WAR-Archive in a Tomcat 7 servlet container

Package second tomcat7 instance not as package installed, but as binaries in `home/nbillen/apache-tomcat-7.0.53`

Port 8084

**Tomcat Manager GUI** [http://elpital.geog.uni-heidelberg.de:8084/manager/](http://elpital.geog.uni-heidelberg.de:8084/manager/) (tomcat-admin:TomCat7Admin)
1.2.2.4.7 W3DS

**General information** Web3DService (W3DS) serves tiled LoD terrain made from LiDAR-data, and LoD1 Buildings. Installation on Windows server as WAR-Archive in tomcat 7 servlet container

**Host** 195.37.175.48 (Windows)

**Port** 8080

**Install directory** C:\MayaArch3D\apache-tomcat-7.0.67\webapps\w3dsmayaarch3D

Tomcat7 is installed as a windows service. Administration, START / STOP the service with the management-gui: C:\MayaArch3D\apache-tomcat-7.0.67\bin\tomcat7w.exe

1.2.2.5 Data Management

1.2.2.5.1 ID Connection Tool

**General information** A web frontend to query and edit some parts of the maya3d database. Main purpose is to enter the corresponding id's from to archaeological database MayaArch3D in the IDAI.Field database from the German Archaeological Institute into the 3D database. This "id connection" is the key to create attribute queries on the IDAI.Field database triggered by 3d objects from the Postgres DB.

**Code** The PHP code for the web application has automatically built by the "PostgreSQL PHP Generator" of the SQL Maestro Group (see http://www.sqlmaestro.com/products/postgresql/phpgenerator/)

**Config** DB Connection Settings are stores in /var/www/idconnection/phpgen_settings.php

Current setting:

```php
function GetGlobalConnectionOptions()
{
    return array(
        'server' => '195.37.175.47',
        'port' => '5432',
        'username' => 'gagugiaro',
        'password' => 'naz77copan',
        'database' => 'maya3d'
    );
}
```
1.2.2.5.2 3D DB Structure Tree Viewer and Segmented Model Builder

General information see 3D DB - Structure Hierarchy Viewer and Segmented Model Builder

Code SVN repository: https://koenigstuhl.geog.uni-heidelberg.de/svn/mayaarch3d/ma3dViewer

Needs access to the maya3d database. Uses maya_reader to retrieve data from the "Structure" table. The role maya_reader has restricted rights to read-only. Uses PHP to request the Postgres database. Uses the d3.js library for the hierarchy tree visualization.

1.2.2.5.3 LiDAR and Mesh preparation tools For the creation of the terrain data we used the following tools:

- QGIS
- CloudCompare
- MeshLab
- Tesselation tool See documentation in the SVN repository https://koenigstuhl.geog.uni-heidelberg.de/svn/mayaarch3d/Tesselation

1. QGIS: Resample the DEM to 1m resolution, export as GeoTIFF
2. CloudCompare: Convert Raster to Point Cloud, reduce to 10,000,000 points (random subsampling)
3. CloudCompare: Convert pointcloud to Mesh (Delauney 2D axis aligned plane)
4. MeshLab: Create various LoDs with Filter "Quadric Edge Collapse Decimation"
5. Tesselation Tool: Cut LoDs into Tiles and write them into a W3DS database

1.2.2.6 Visualization Components
1.2.2.6.1 2D Geobrowser (Client) / Geomajas  Main application where everything is integrated. The 2D Geobrowser is based on the open-source WebGIS framework Geomajas (http://www.geomajas.org/).

The framework has been extended:

- Query Builder (space-time-attribute filtering)
- Integration of 3D Scene Viewer
- Integration of ID Connection Tool
- Provides Security via LDAP Server

Code: https://koenigstuhl.geog.uni-heidelberg.de/svn/mayaarch3d/geobrowser

URL: www.mayaarch3d.org:9999 (Login with LDAP project Account)

1.2.2.6.2 Light table (ImageViewer)  The Light table is implemented as a Plugin for the MA3D.js library. It depends on the Imageservice. It was authored by Nicolas Billen.

Find the code in the SVN: https://koenigstuhl.geog.uni-heidelberg.de/svn/mayaarch3d/ma3dViewer/trunk/lib/MA3D/plugins

1.2.2.6.3 3D Scene Viewer and 3D SingleObject Viewer  Both viewers use Giscene.js library and MA3D.js library. The Scene Viewer depends on the W3DS and retrieves the data via an Apache proxy URL. Both Viewer use the GeometryService and the Imageservice via the Apache proxy.

- 3D SingleObject Viewer
  - Install directory:
    /var/www/dev/ldaptest/singleObjectViewer/sov.html
    /var/www/dev/examples/singleObjectViewer/sov.html
  - Web URLs:
    http://www.mayaarch3d.org/dev/ldaptest/singleObjectViewer/sov.html
    http://www.mayaarch3d.org/dev/examples/singleObjectViewer/sov.html
  - Code:
    see SVN: https://koenigstuhl.geog.uni-heidelberg.de/svn/mayaarch3d/ma3dViewer

- 3D Scene Viewer
- Install directory:
  /var/www/dev/ldaptest/singleObjectViewer/sceneViewer.html
  /var/www/dev/examples/singleObjectViewer/sceneViewer.html
- Web URLs:
  http://www.mayaarch3d.org/dev/ldaptest/singleObjectViewer/
  sceneViewer.html http://www.mayaarch3d.org/dev/examples/
  singleObjectViewer/sceneViewer.html
- Code:
  see SVN: https://koenigstuhl.geog.uni-heidelberg.de/svn/
  mayaarch3d/ma3dViewer

1.2.3 Light table, Image Service, link to Arachne service

The Light table displays images that are stored in the DAIs Arachne DB (http://arachne.uni-koeln.de/drupal/). To do this the Light table requests the ImageService which provides an API for getting Thumbnails etc. The ImageService then requests the Arachne DB.

See also in System architecture: [imageservice]

ImageService Code https://koenigstuhl.geog.uni-heidelberg.de/svn/mayaarch3d/imageservice


1.2.4 Time Service

See also in System architecture: [Timeservice]

Code https://koenigstuhl.geog.uni-heidelberg.de/svn/mayaarch3d/
timeservice-jar/trunk

1.2.5 Attribute Service

The attribute service is used to get archaeological information belonging to structures. The geometry of the structures is stored in the maya3d DB while the attributes are maintained in a separate database at the DAI (IDAI.Field). Both databases are interconnected by an ID. You can request it with the following URL:
http://www.mayaarch3d.org/as/2479

//Response will look like this (JSON)
{"Kommentar":"Peter Biro","Erhaltung_Grapheme_Logographisch":"26+","[Doku_Zeichnung_Anzahl]":"1","DS_Bearbeitungsdatum":"2015-07-08","PS_InscriptID":"2479","KurzbeschreibungInschrift":"Stela 11","Text_Uebersetzung":"At 8 Ajaw it came down at the House of the Tilt, the Obsidian Face, the Flint Face Waxaklaju’n Ub’aah Chan arrived and then K’hich Yax K’uk’ Mo’, the Divine Ch’uup? Lord was brought forth by Yax Pa[h]ls[aj] Chan Yopaat, 3 winikhaab’ Lord, First on Earth.","FS_ToposID":"336","Erhaltung_Grapheme_Syllabisch":"27+","[Doku_Foto_Anzahl]":"3","Text_Lesbarkeit":"good","Technik":"carving","ma3d_attribute_id":"2479","[UeberschriftNew]":"Inscription","Erhaltung_GraphemeNr":"53+","Text_Edition":"ti 8 ajaw jomoyi will te’ naah huli taaj uut to’ok’ uut waxaklaju’n ub’aah chan ulok’ k’i[h]nich yax k’uk’ mo’ k’uh[ul] ch’uup’ ajaw yax pa[h]ls[aj] chan yopaat 3 winikhaab’ ajaw b’ahkab’","Text_Transkription":"ti-8-AJAW jo-mo-yi WIL-TE’-NAH hu-li ta-ji u-UT-ti TOK’-u-UT-ti 18-u-B’AH CHAN-na u-lo-k’o K’IN-ni-chi YAX-K’UK’-MO’ K’UH-ch’u?-pi-AJAW-wa YAX-PAS CHAN-na YOP-AT-ti 3-WINIKHAB’ AJAW-wa B’AH-ka-b’a’

See also in System architecture: Attributeservice

Code [https://koenigstuhl.geog.uni-heidelberg.de/svn/mayaarch3d/attributeservice](https://koenigstuhl.geog.uni-heidelberg.de/svn/mayaarch3d/attributeservice)

1.2.6 Geometry Service

The geometry service is used to dynamically build a hierarchical Threejs-SCENE file (ver 3.2) from entries in the maya3d DB.

See also in the System architecture: Geometryservice

Code [https://koenigstuhl.geog.uni-heidelberg.de/svn/mayaarch3d/geometryservice](https://koenigstuhl.geog.uni-heidelberg.de/svn/mayaarch3d/geometryservice)

The Service can be requested with the following URL:

http://www.mayaarch3d.org/gs_new/json/1234/1418/children/lod/4/<URL>/json/anynumber/geometryID/(children OR node)/lod/lodnumber{1..4}
1.2.7 PostGIS 1.5 and 2.0

- See: Databases

1.2.8 3D Scene Viewer/3D Single Object Viewer - Developer documentation

Both viewers are based on GIScene.js library (WebGL) and MA3D.js library for the User-Interface.

The SingleObjectViewer can be configured by JavaScript or via URL params:

//via JavaScript Constructor
var sov = new MA3D.SingleObjectViewer(containerDiv, modelURL, format, verticalAxis, georef, segmented);

/*
containerDiv - {HTMLDivElement} where the SingleObjectViewer will be shown
modelURL - {String} local or external.url of a model, which will be loaded
format - {String} one of the following:
  - json : Three.js-JSON Format 3.1
  - scene: Three.js-Scene Format 3.2
  - ctm: OpenCTM Format (can be created with MeshLab)
verticalAxis - {String} one of the following: Y (default) or Z
georef - {Boolean} specify true or false to indicate whether the loaded model has georeferenced coordinates. If so a compass will be displayed.
segmented - {Boolean} specify if the model is hierarchically segmented and has special names with ids. This is used to activate the special user interface to retrieve information from the attribute service. Segment names in the format follow the pattern:
  (group|object)_{int}geometryId_{int}filemakerId_{int}_{int},
  e.g. object_4308_56006_0_0
*/

//via URL params

1.2.9 MayaArch3D OpenSource Code (tools, services, libraries)

- All PUBLIC Code from the MayaArch3D project can be found on GitHub
- https://github.com/GIScience/MayaArch3D
- https://github.com/GIScience/GIScene.js

- All internal code can be found in a Subversion repository (SVN) of the GIScience Research Group, Institute of Geography, Heidelberg University

SVN URL https://koenigstuhl.geog.uni-heidelberg.de/svn/mayaarch3d