VTS 3D Map Streaming and Rendering Stack

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melown

I. **Introducing VTS**

II. **VTS Architecture**

III. **Getting Started with VTS**

+ Q and A

I. Introducing VTS

What VTS is

- An integrated platform for 3D map application development
  - A set of 2D and 3D geospatial data fusion tools
  - A set of server-side components for 3D geospatial data streaming
  - A set of client-side libraries for interactive 3D map rendering

Think Google Earth Enterprise, but on 2017 technology standards

What VTS is not:

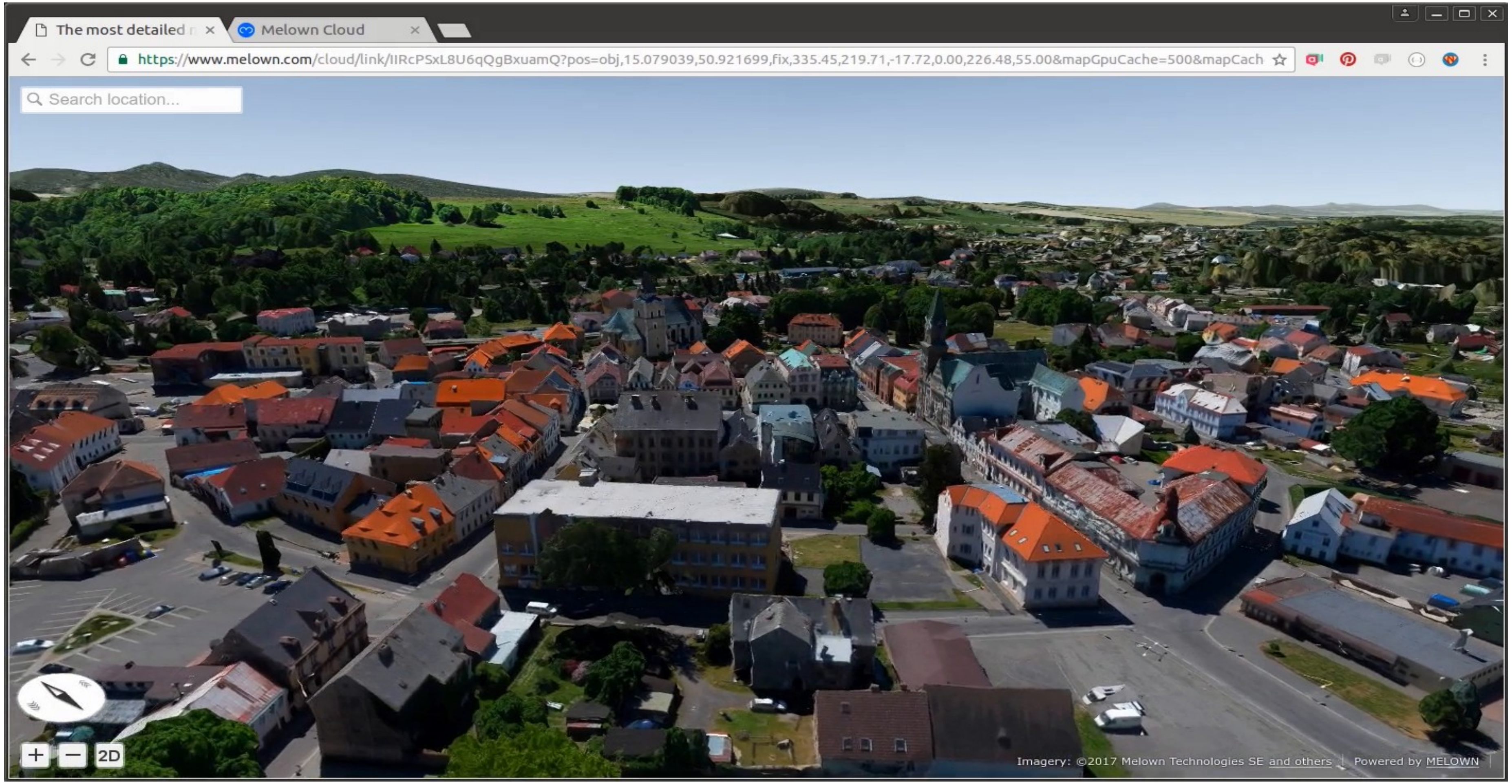
- Google Maps / Google Earth
- Cesium JS
- ArcGIS Online, Agency9, SkylineGlobe, etc

but

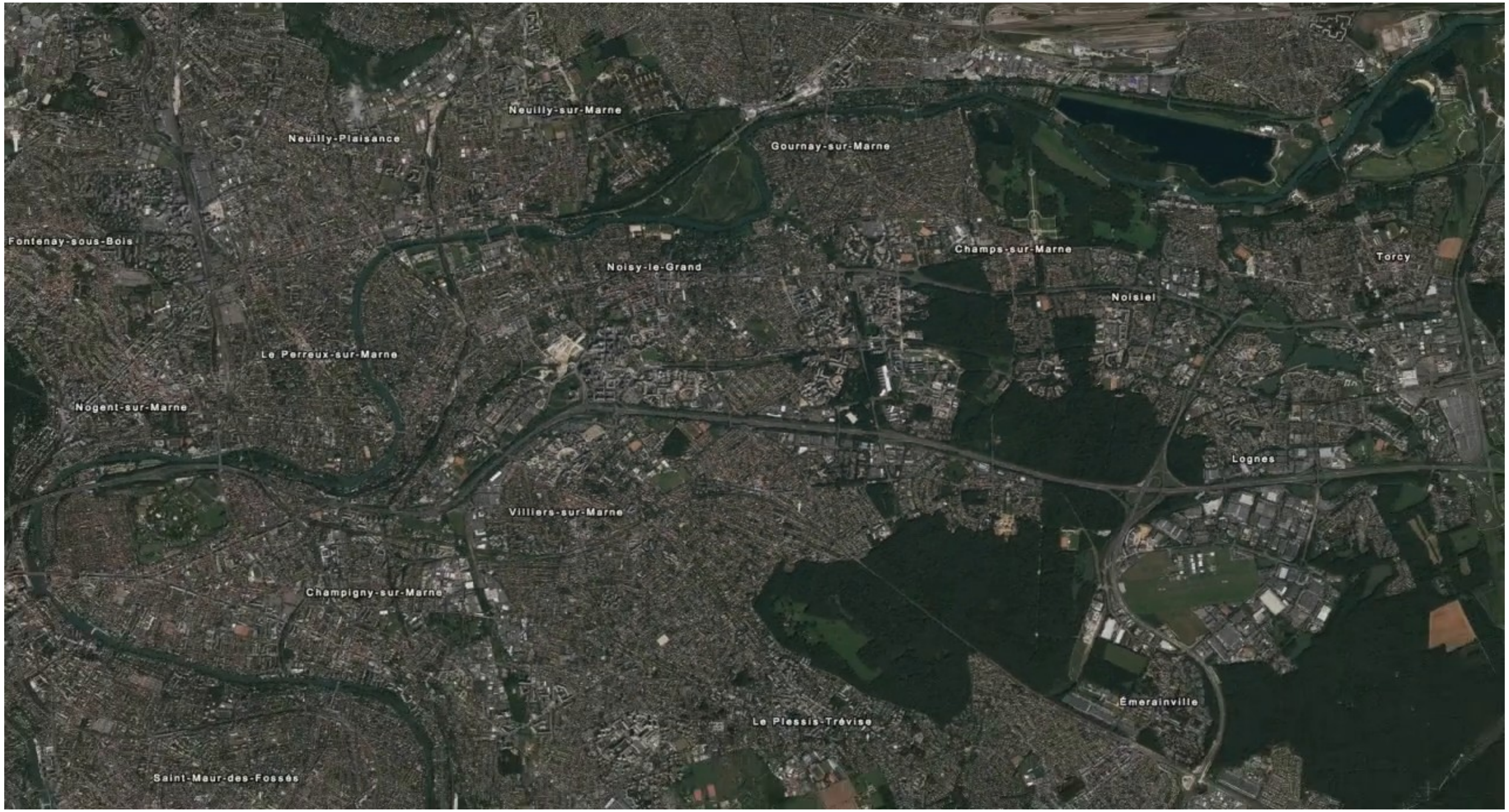
- interoperability is encouraged and supported whenever possible
- VTS may be used as both an alternative and a complement to these systems

What you can do with VTS:

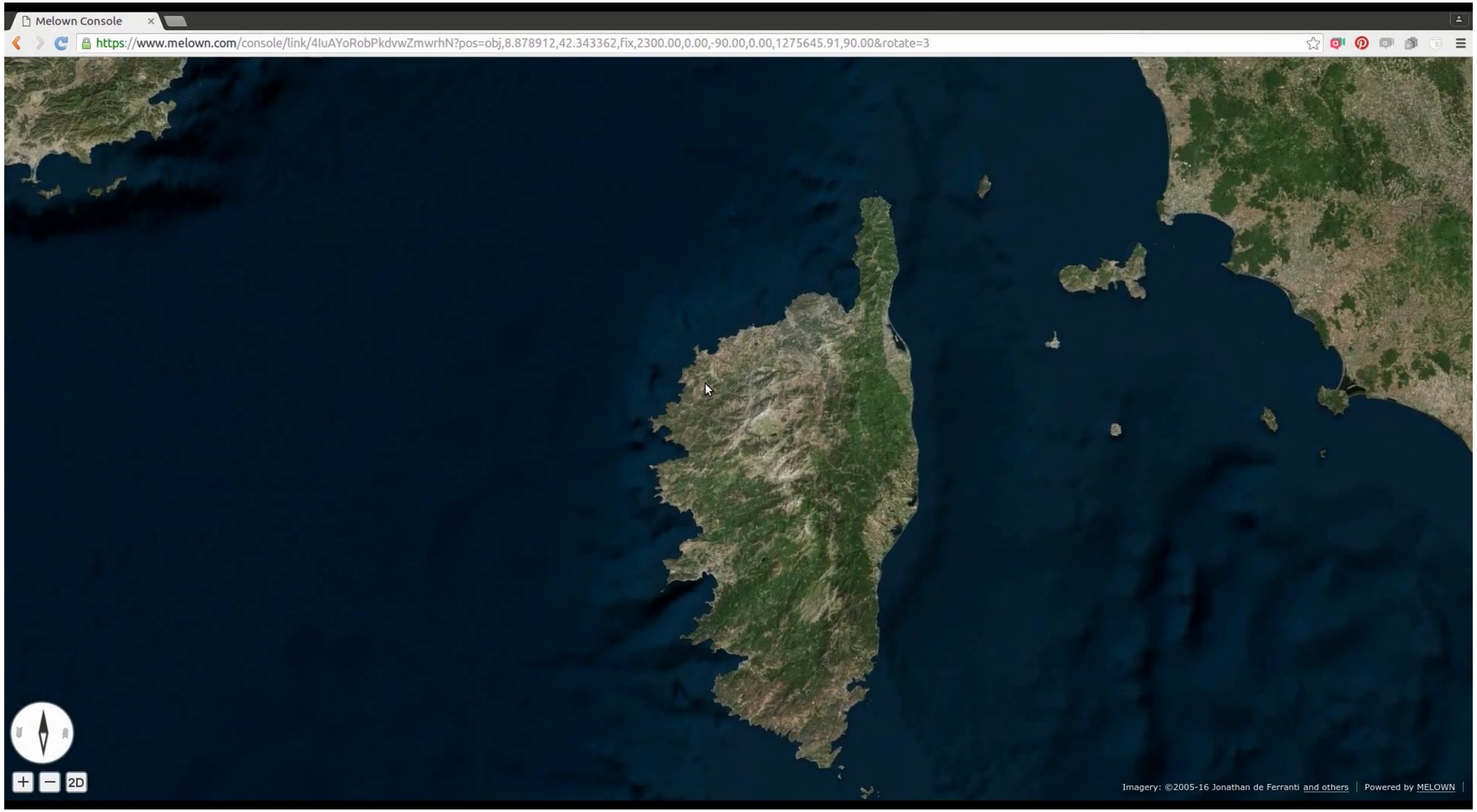
✔ stream and render photorealistic landscapes at street level detail and at planetary scale


The most detailed
Melown Cloud
https://www.melown.com/cloud/link/IIRcPSxL8U6qQgBxuamQ?pos=obj,15.079039,50.921699,fix,335.45,219.71,-17.72,0.00,226.48,55.00&mapGpuCache=500&mapCach
Search location...
+
−
2D
Imagery: ©2017 Melown Technologies SE and others
Powered by MELOWN

- ✓ render place and street labels, stylable and multi-resolution



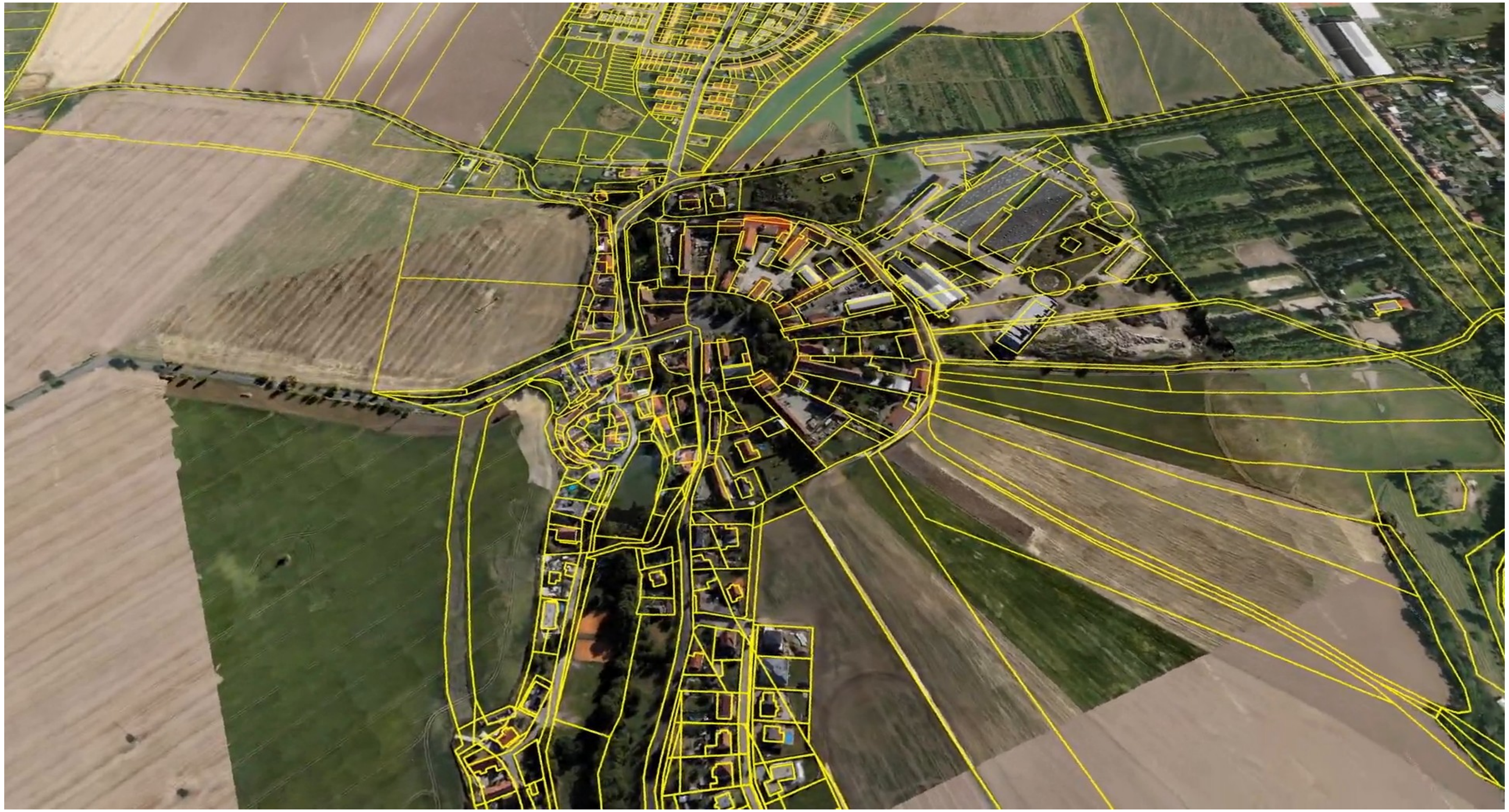
- ✔ dynamically generate and stream 3D globes based on DEMs and DSMs



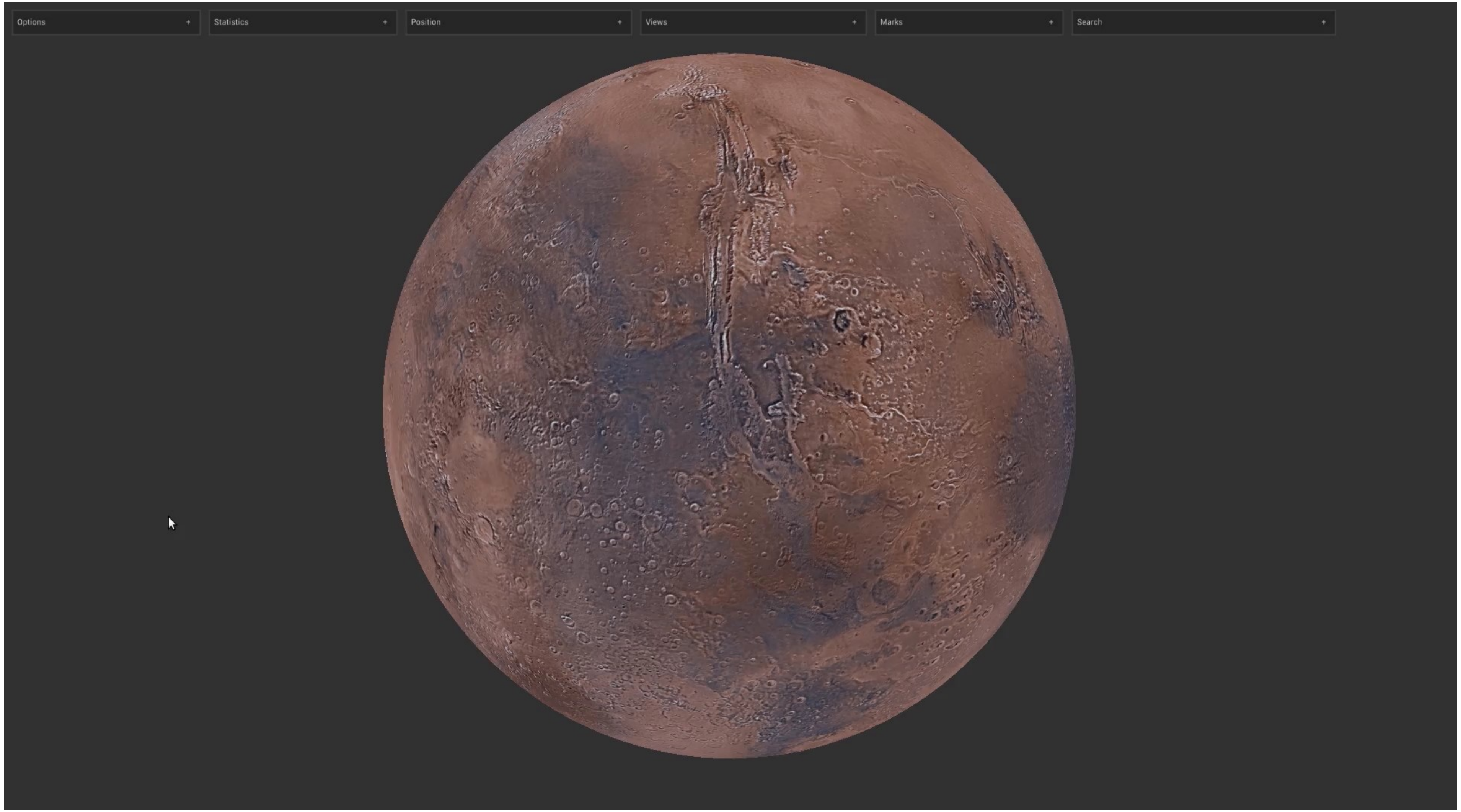
https://www.melown.com/console/link/4IuAYoRobPkdvwZmwrhN?pos=obj,8.878912,42.343362,fix,2300.00,0.00,-90.00,0.00,1275645.91,90.00&rotate=3

Imagery: ©2005-16 Jonathan de Ferranti and others | Powered by MELOWN |

- ✓ create complex GIS integrations



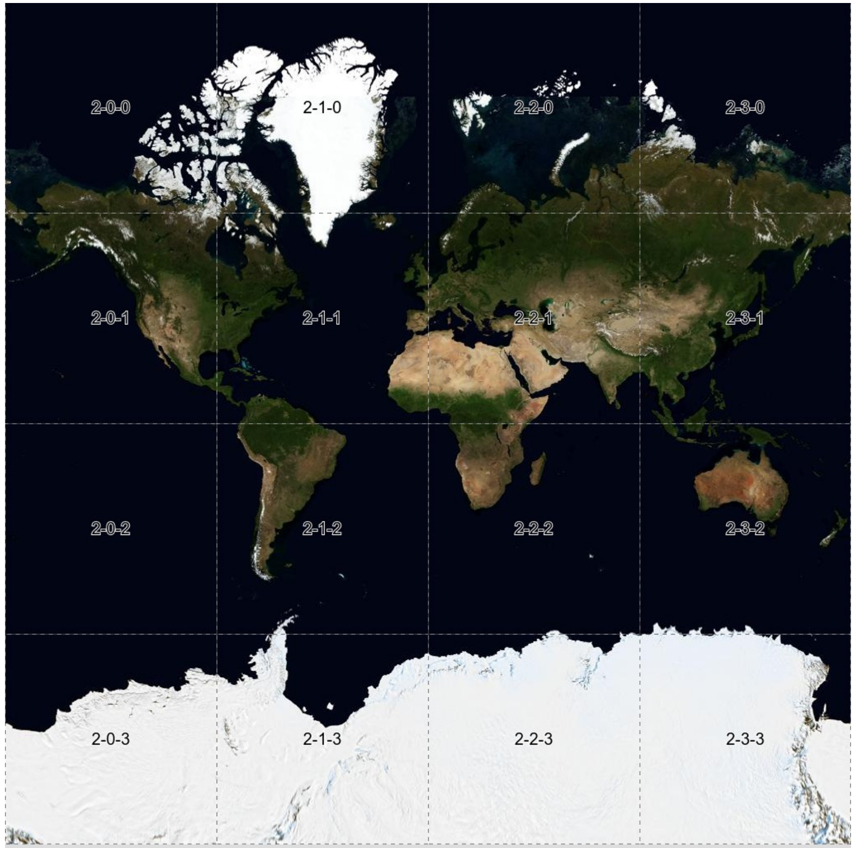
- ✔ visualize 3D remote sensing data interactively

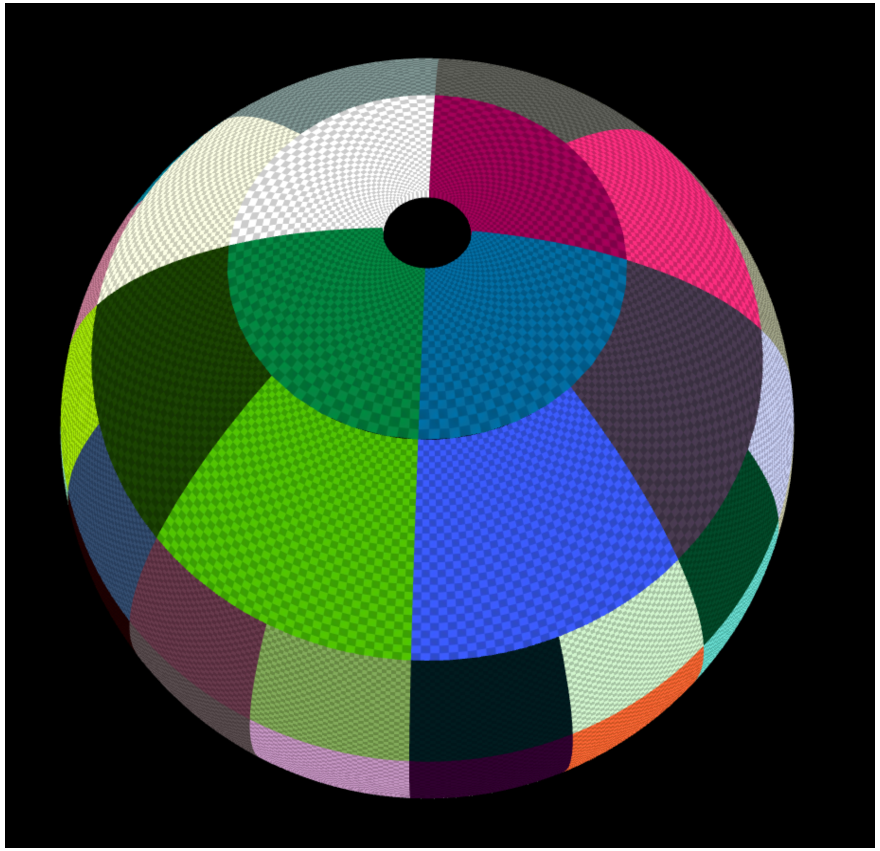


- and have fun writing games!

VTS Racing
on Android

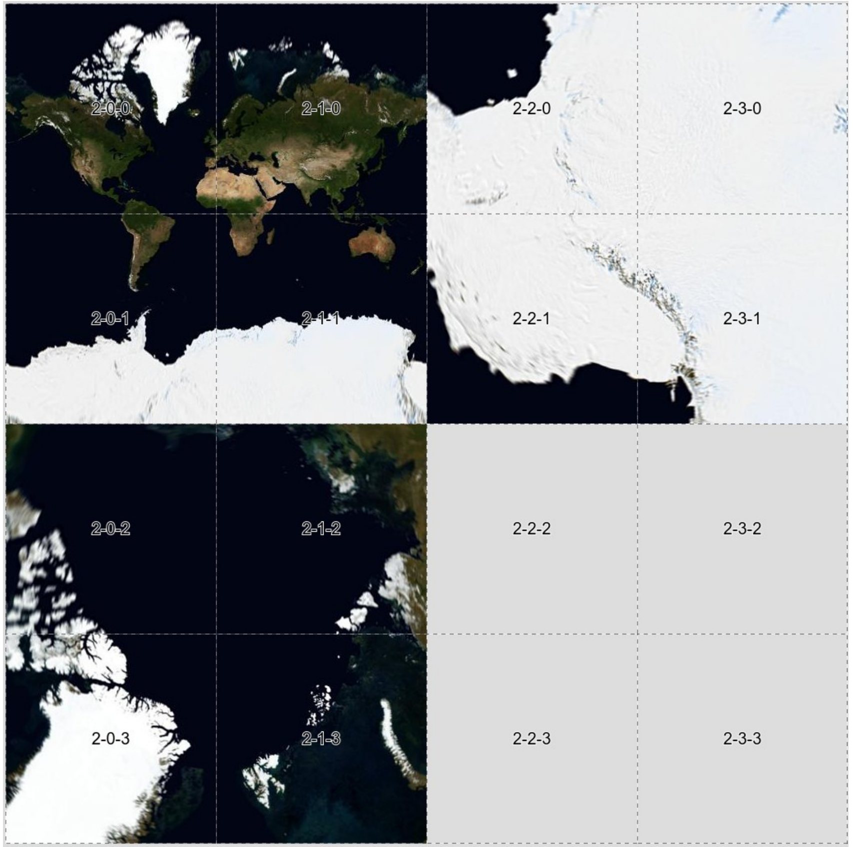
Coordinate system agnosticism

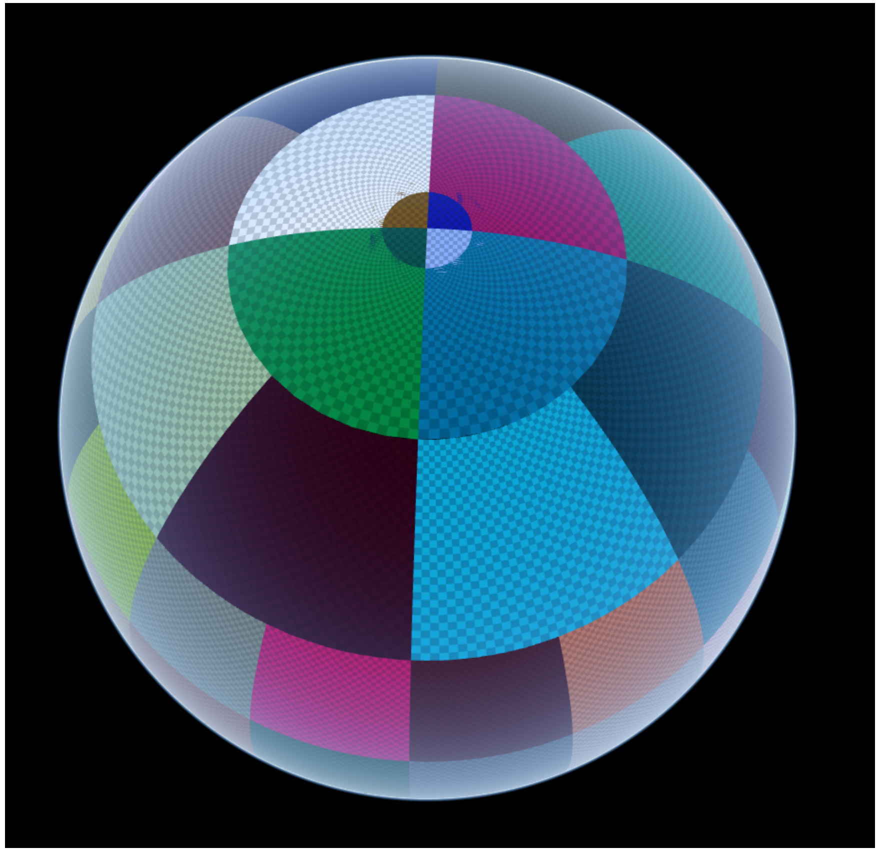




webmerc reference frame

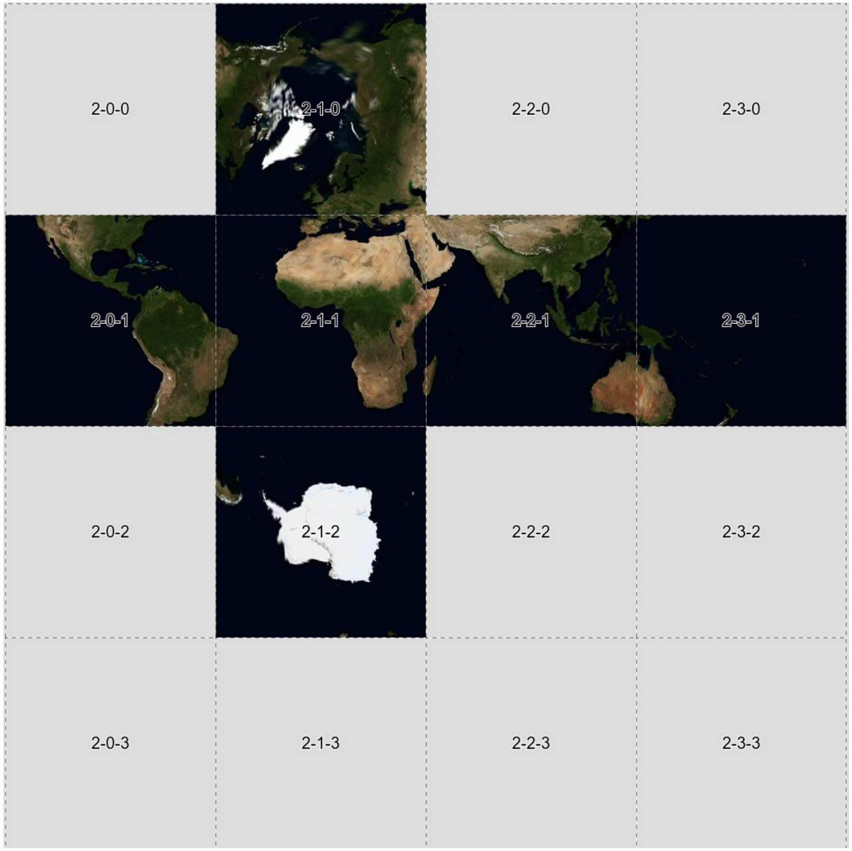
Coordinate system agnosticism

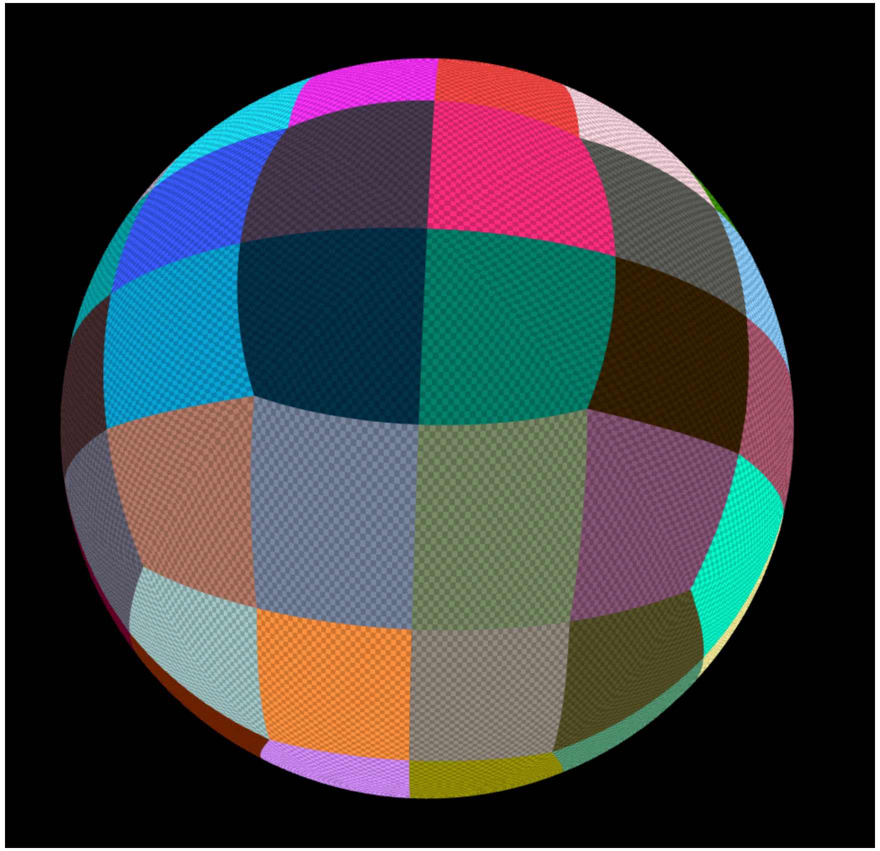




melown2015 reference frame

Coordinate system agnosticism





earth-qsc reference frame

More VTS selling points

- JavaScript and C++11 client libraries
- GDAL rasters and OGR vectors with stylesheets
- WMS/WMTS and Mapbox vector tile support
- Open source under BSD 2-clause license

Melown Cloud

- a cloud 3D map development platform operated by Melown Tech atop of VTS
- a point-and-click interface to a subset of VTS functionality
- ideal for smaller projects and less technically savvy users

www.melown.com/cloud

II. VTS Architecture

VTS architecture

- Streaming servers: **mapproxy** and **vtsd**
- Rendering libraries: **vts-browser.js** (JavaScript) and **libvts-browser** (C++)
- Data fusion and management tools: **vts**, generatevrtwo, etc.
- Encoders: vts2vts, vef2vts, slpk2vts, etc.

VTS streaming servers: mapproxy*)

- An HTTP server
- Performs on the fly conversion of non-VTS GIS formats to VTS streaming formats
- (a powerful SRS transforming TMS server)

Input formats: GDAL rasters, OGR vectors, Mapbox vector tiles

Output formats: surfaces, bound layers, tiled geodata

*) github.com/Melown/vts-mapproxy

VTS streaming servers: vtsd*)

- An HTTP server
- Streams static tilesets as surfaces or free layers
- Translates storage views into streamable VTS map configurations
- Implements TILeARchive – efficient format for 3D tile hierarchy storage

*) github.com/Melown/vts-vtsd

VTS data management tools: vts*)

A Swiss army knife of VTS storage management:

```
$ vts --create mystorage --referenceFrame melown2015
$ vts mystorage --add --tileset local:<path-to-tileset> --top
$ vts mystorage -add http://<mapproxy-surface-url> --top
```

If mystorage is inside vtsd root, mystorage/mapConfig.json yields a map configuration with both surfaces in proper stacking order.

*) github.com/Melown/vts-tools

VTS rendering libraries: vts-browser-js*)

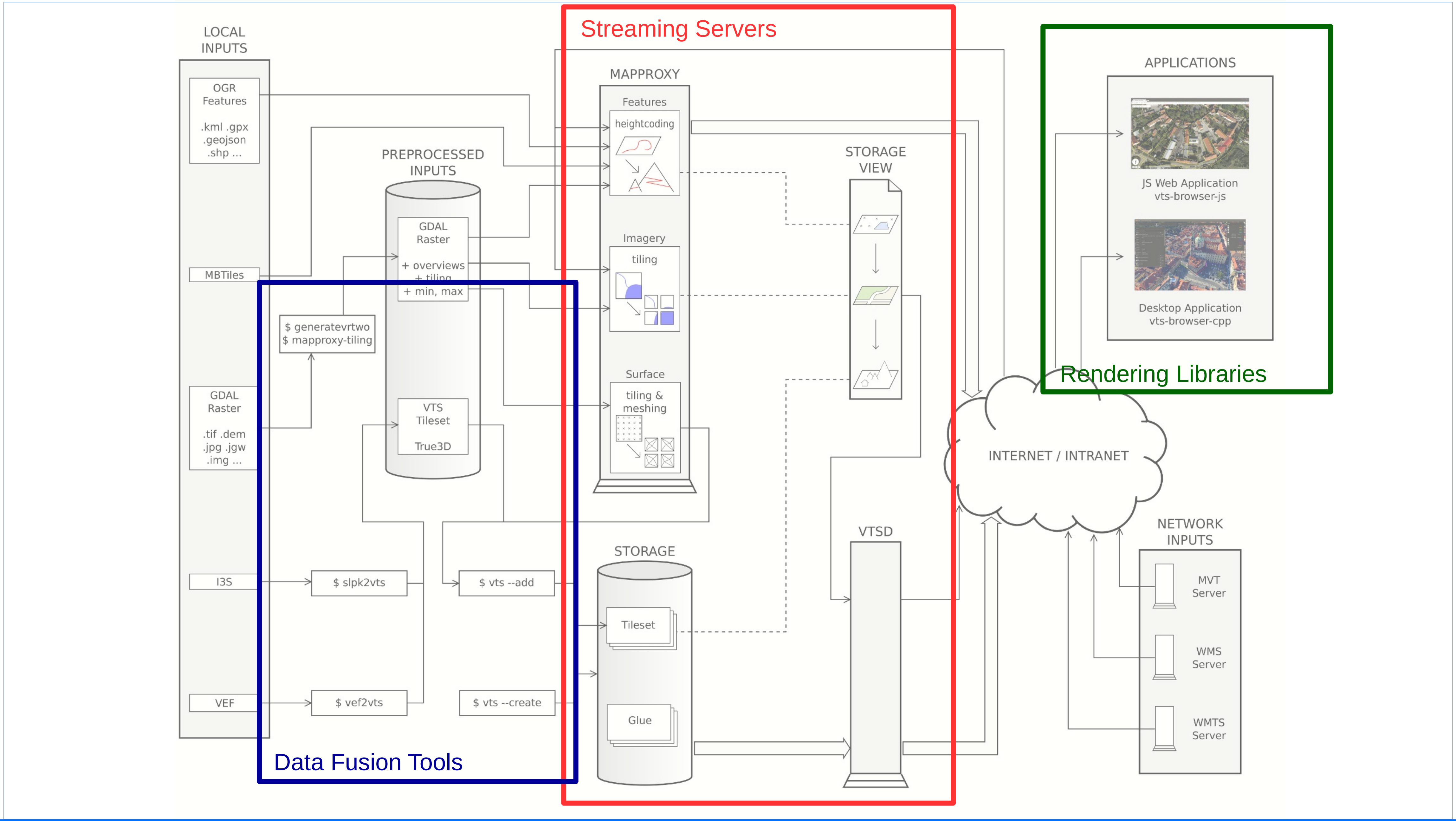
- All encompassing WebGL-based VTS client-side implementation
- Comprehensive API
- Currently about 176 kB gzipped and minified
- Works in all modern browsers
- Rudimentary mobile support

*) github.com/Melown/vts-browser-js

VTS rendering libraries: libvts-browser*)

- a recent C++ client library
- very small footprint, lightweight
- separate from actual rendering layer
- developed and tested on GNU/Linux desktop, awaits ports to other platforms

*) github.com/Melown/vts-vtsbrowser-cpp



Streaming Servers

Rendering Libraries

Data Fusion Tools

LOCAL INPUTS

OGR Features

.kml .gpx .geojson .shp ...

MBTiles

GDAL Raster

.tif .dem .jpg .jgw .img ...

I3S

VEF

PREPROCESSED INPUTS

GDAL Raster

+ overviews

+ tiling

+ min, max

VTS Tileset

True3D

$ generatevrtwo

$ mapproxy-tiling

$ slpk2vts

$ vef2vts

$ vts --add

$ vts --create

MAPPROXY

Features

heightcoding

Imagery

tiling

Surface

tiling & meshing

STORAGE VIEW

STORAGE

Tileset

Glue

VTSD

INTERNET / INTRANET

APPLICATIONS

JS Web Application

vts-browser-js

Desktop Application

vts-browser-cpp

NETWORK INPUTS

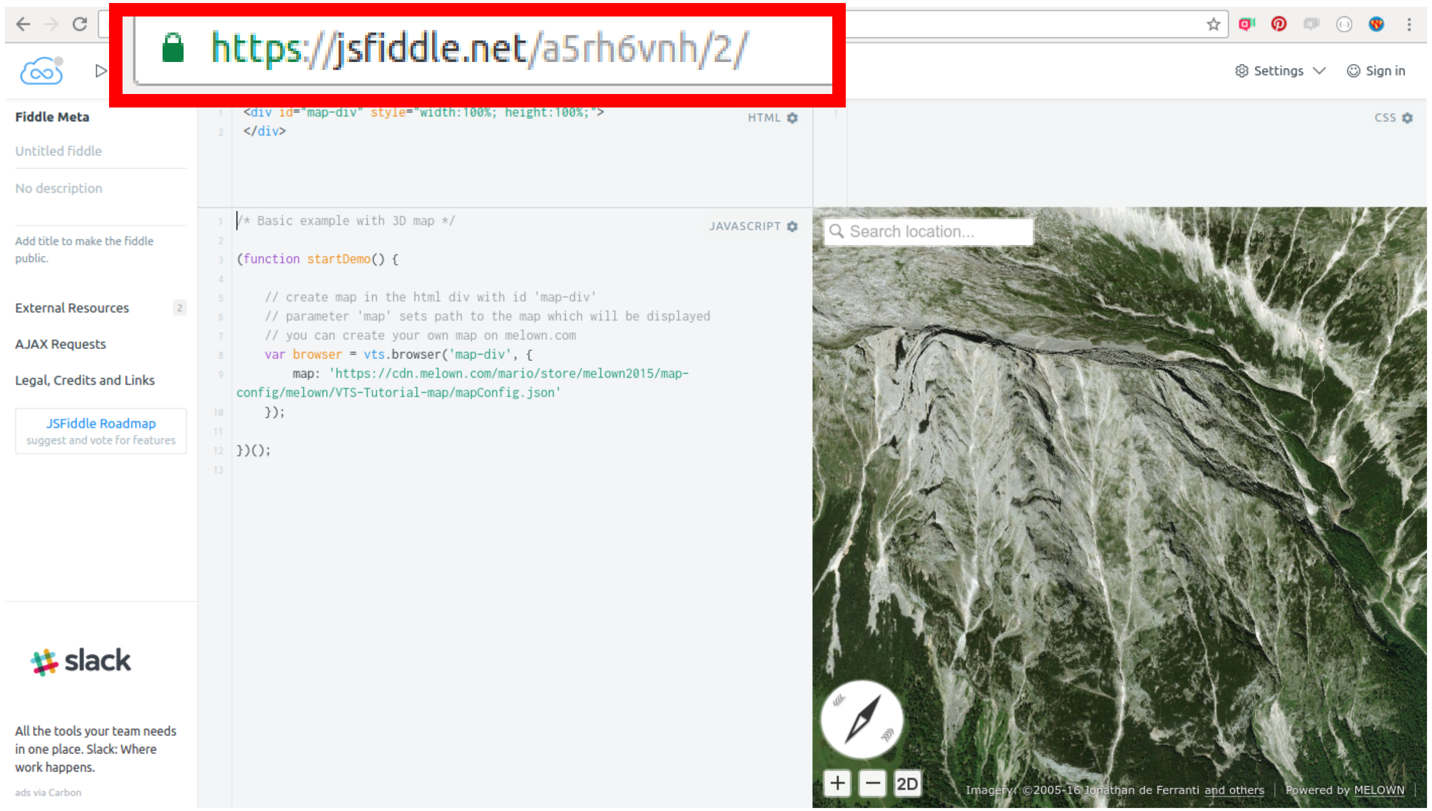
MVT Server

WMS Server

WMTS Server

III. Getting Started with VTS

Getting started with VTS JavaScript API*)



https://jsfiddle.net/a5rh6vnh/2/
Settings
Sign in
Fiddle Meta
Untitled fiddle
No description
Add title to make the fiddle public.
External Resources 2
AJAX Requests
Legal, Credits and Links
JSFiddle Roadmap
suggest and vote for features
HTML
CSS
JAVASCRIPT
Search location...
2D
Imagery: ©2005-16 Jonathan de Ferranti and others | Powered by MELOWN

```html
<div id="map-div" style="width:100%; height:100%;">
</div>
```

```javascript
/* Basic example with 3D map */

(function startDemo() {

    // create map in the html div with id 'map-div'
    // parameter 'map' sets path to the map which will be displayed
    // you can create your own map on melown.com
    var browser = vts.browser('map-div', {
        map: 'https://cdn.melown.com/mario/store/melown2015/map-config/melown/VTS-Tutorial-map/mapConfig.json'
    });

})();
```

JS Fiddle live examples**)

*) github.com/Melown/vts-browser-js/wiki

**) https://github.com/Melown/vts-browser-js/wiki/Examples

Setting up a mapconfig

A.) use one of the public URLs available from Melown Tech, or

B.) use Melown Cloud (melown.com/cloud), or

C.) install and configure VTS streaming servers

Getting started with VTS streaming servers

Set up your own data management and streaming:*)

```
$ apt install vts-backend
```

*) more details at melown.com/vtstutorials

Getting started with VTS C++ desktop API

For C++ desktop application development:*)

```
$ apt install libvts-browser-dev vts-browser-glfw
$ vts-browser-glfw <map configuration url>
```

Then use the Qt5 sample application**) as a starting point.

*) more details at github.com/Melown/vts-browser-cpp

**) github.com/Melown/vts-browser-cpp/tree/master/browser/src/vts-browser-qt

Sources of VTS information

melown.com/vts

github.com/Melown

Getting involved in VTS development

contact: community@melown.com

or fork us on GitHub ;-)

“An Unlikely Road to an Advanced 3D Mapping Open Source Technology”

Today at 13:30 at Waterfront 2