

Frascati (Rome), ESA-ESRIN, 12-14 October 2015

POLITECNICO DI MILANO
GEOlab - COMO Campus



NASA Web World Wind: welcome to the new era of virtual globes

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Participatory sensing applications



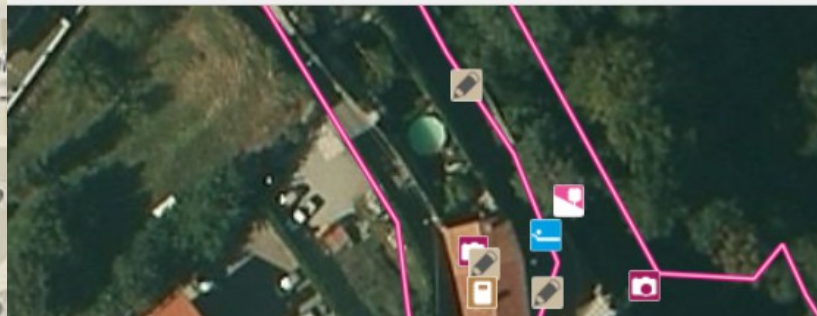
Bike Parking



Architectural barriers

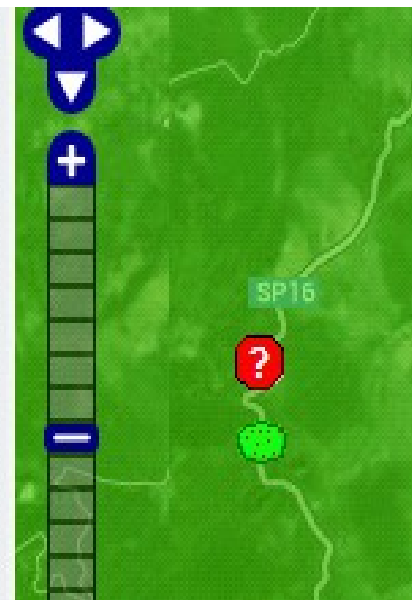


Cultural elements



Street furniture

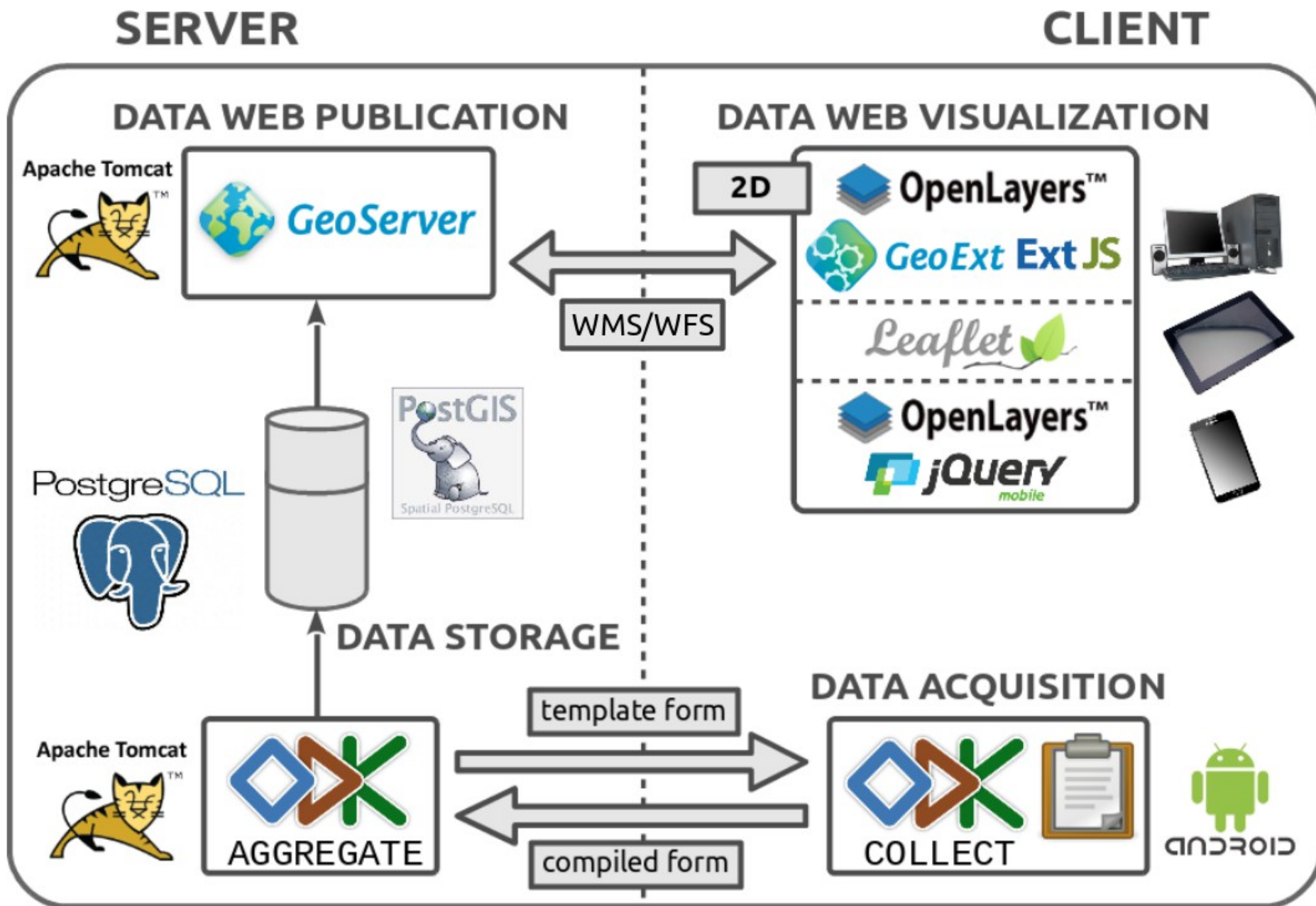
- Herb
- Shrub
- Tree
- Old Tree
- Unknown/Other Plant
- Intrusive Plant
- Legal Pruning
- Natural Partitioning
- Illegal Pruning



Biodiversity



Participatory sensing FOSS 2D architecture





ODK Collect > Osaka...

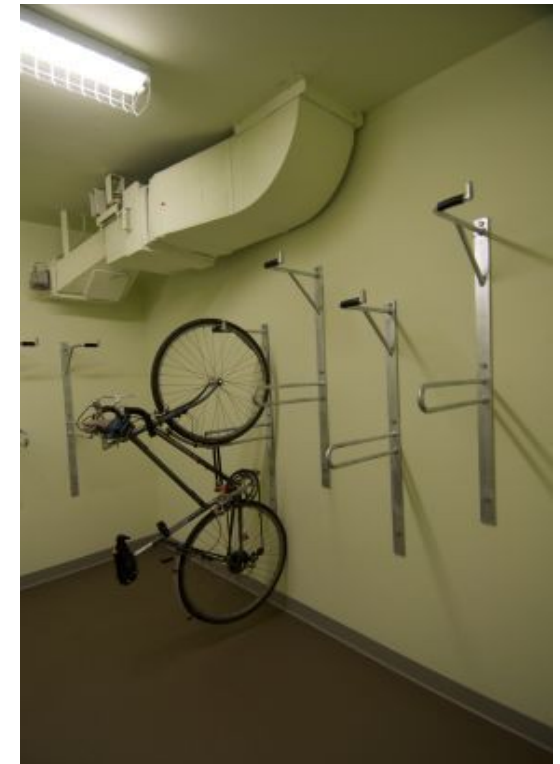
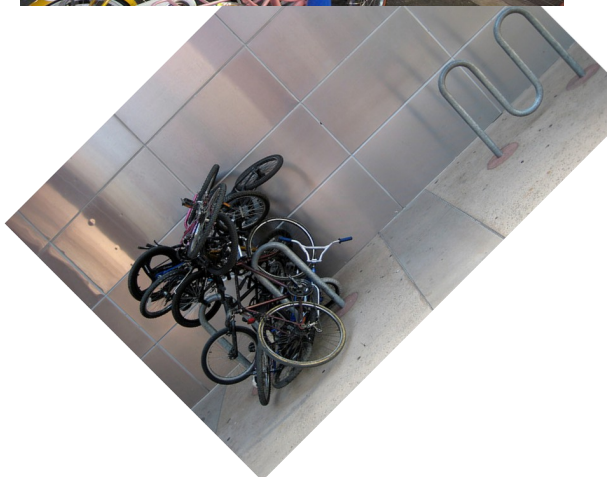

OSAKA bike parking REPORT

OSAKA CITY UNIVERSITY
POLITECNICO DI MILANO

You are at the start of Osaka Bike Parking Report. Swipe the screen as shown below to go backward and forward.

backward to previous prompt

forward to next prompt



<http://geomobile.como.polimi.it/Osaka/>



INSTRUCTIONS		
STEP	WINDOWS	LINUX
1) Install the Java Virtual Machine (JVM)	- Download and install from here	
2) Install the multimedia viewer	- Download and install from here	
3) Launch the Java Control Panel:	- Launch the Windows Start menu - Click on Programs - Find the Java program listing - Click on Configure Java	- Open the Terminal Window - Type: ControlPanel
4) Set the JVM security exception:	- Click on the Security tab - Click on the Edit Site List button - Click Add in the Exception Site List window - Add the IP: 131.175.143.48	
5) Start the application	- Click here or on the banner below	
6) Configure the multimedia viewer	- Select Preferences in the Options menu of the 3D Viewer - Check the VLC radiobutton, click the Browse button and select the following vlc executable file:	
	for 64bit version: C:\Program Files\VideoLAN\VLC\vlc.exe for 32bit version: C:\Program Files x86\VideoLAN\VLC\vlc.exe	/usr/bin/vlc



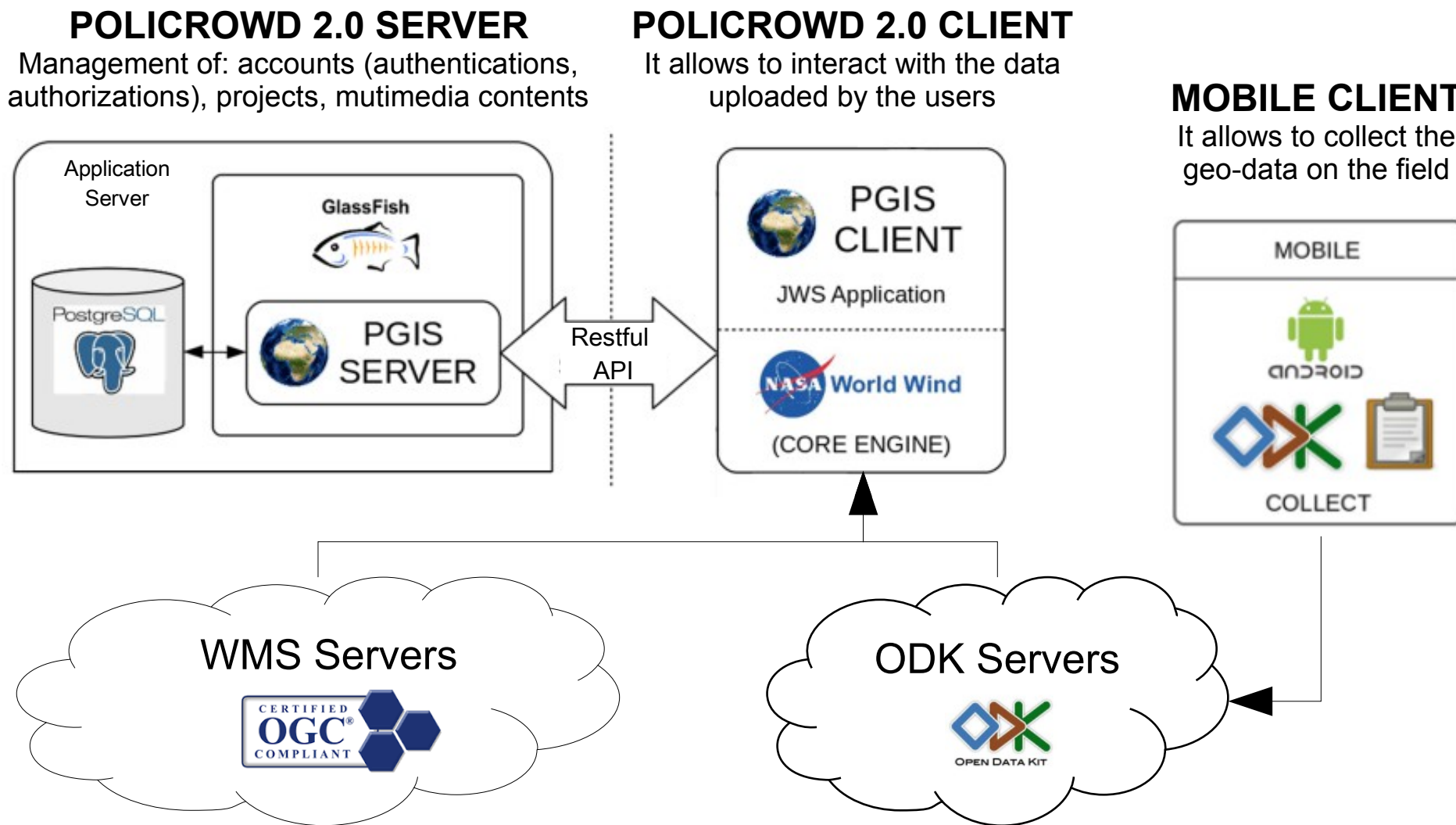
<http://geomobile.como.polimi.it/policrowd2.0/>

<http://viaregina2.como.polimi.it/Osaka/>

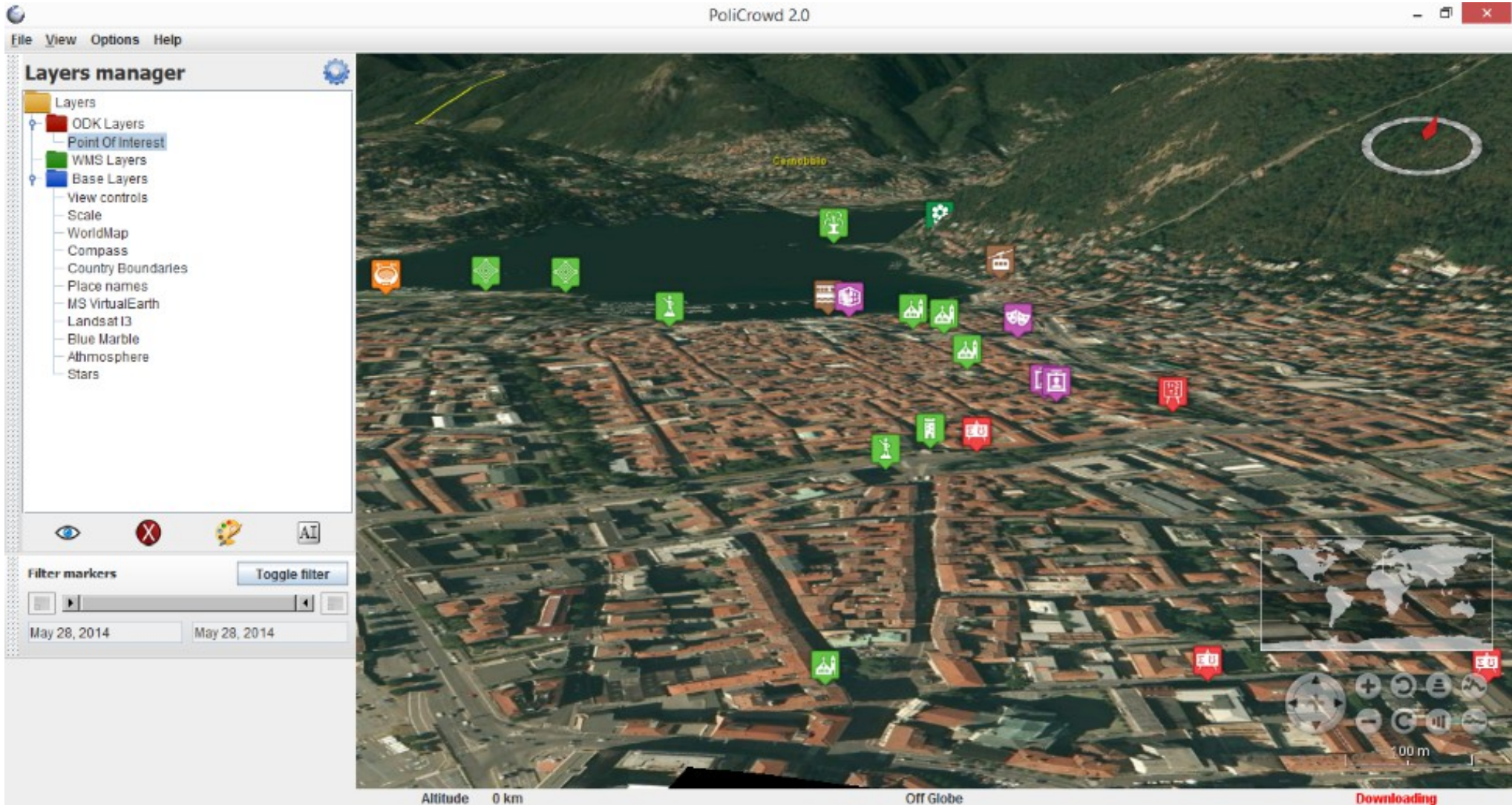
http://viaregina3.como.polimi.it/ViaRegina/instructions_3D_EN.html



PoliCrowd 2.0: Architecture



PoliCrowd 2.0: 3D data visualization



- Clickable POIs placemarks
- Visualization of the ODK Collect-reported information (including picture)

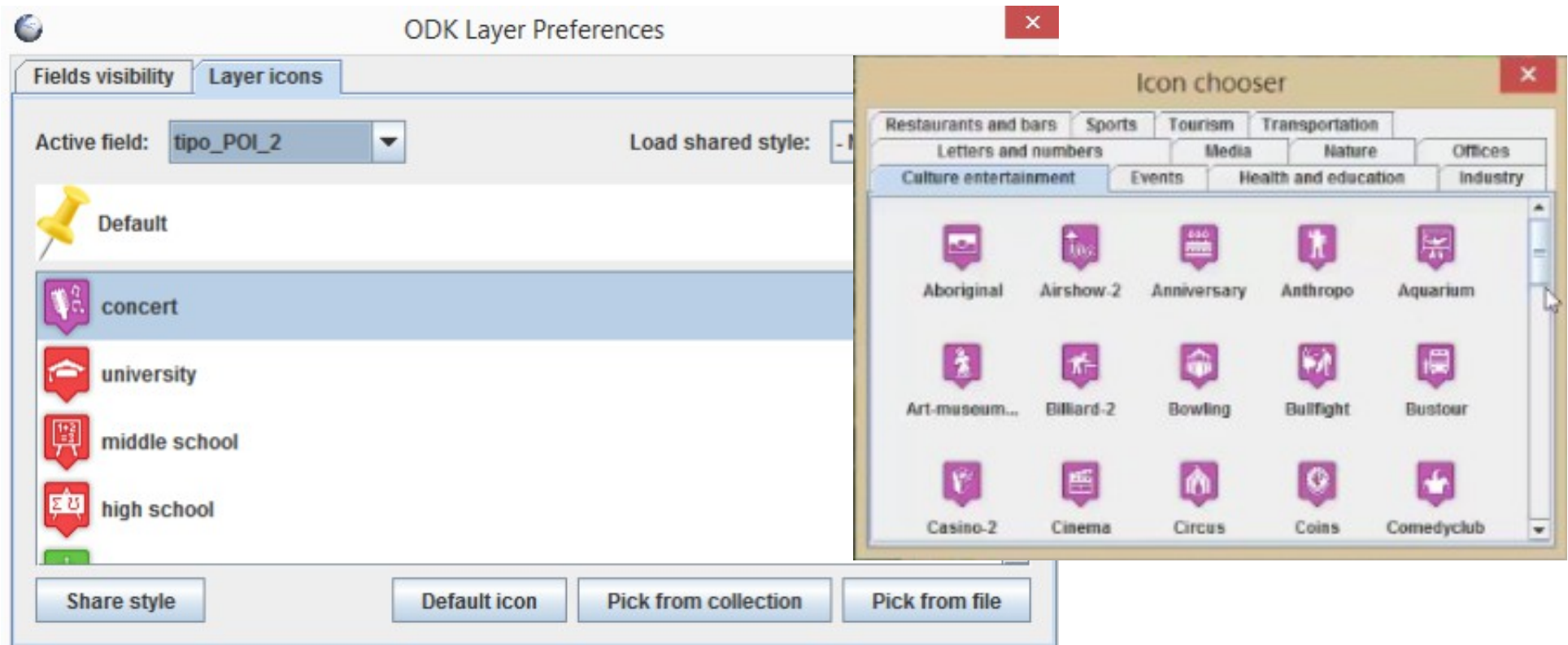
The screenshot displays the PoliCrowd 2.0 application window. On the left, a 'Layers manager' panel lists various map layers such as 'ODK Layers', 'Point Of Interest', 'WMS Layers', and 'Base Layers'. Below this is a 'Filter markers' section with a date range from May 20, 2014, to May 20, 2014. The main area is a satellite map of a city with numerous colorful POI markers. A detailed information panel is open over one marker, showing a photo of a stadium and the following data:

- Accuracy: 75.000000000
- Elevation: 0E-10
- Latitude: 45.0138420000
- Longitude: 9.0723950000
- descriz_POI: [view the wiki page](#)
- noma_POI: Stadio Giuseppe Sinigaglia
- posiz_POI: 45.0138420000 9.0723950000
- 0E-10 75.0000000000
- tipo_POI: sports facility
- tipo_POI_2: stadium

At the bottom of the information panel is a 'Multimedia & comments' section. The map interface includes a compass, a scale bar (500 m), and a 'Off Globe' indicator.



- ODK layers are fully customizable, thanks to a suitable layer management interface
- Users select the fields they want to display for each layer of a given project, and personalize marker icons by picking them from a default collection or providing them manually
- Styles are also shareable, so that users can take advantage of the already available icons provided by other users in their own projects





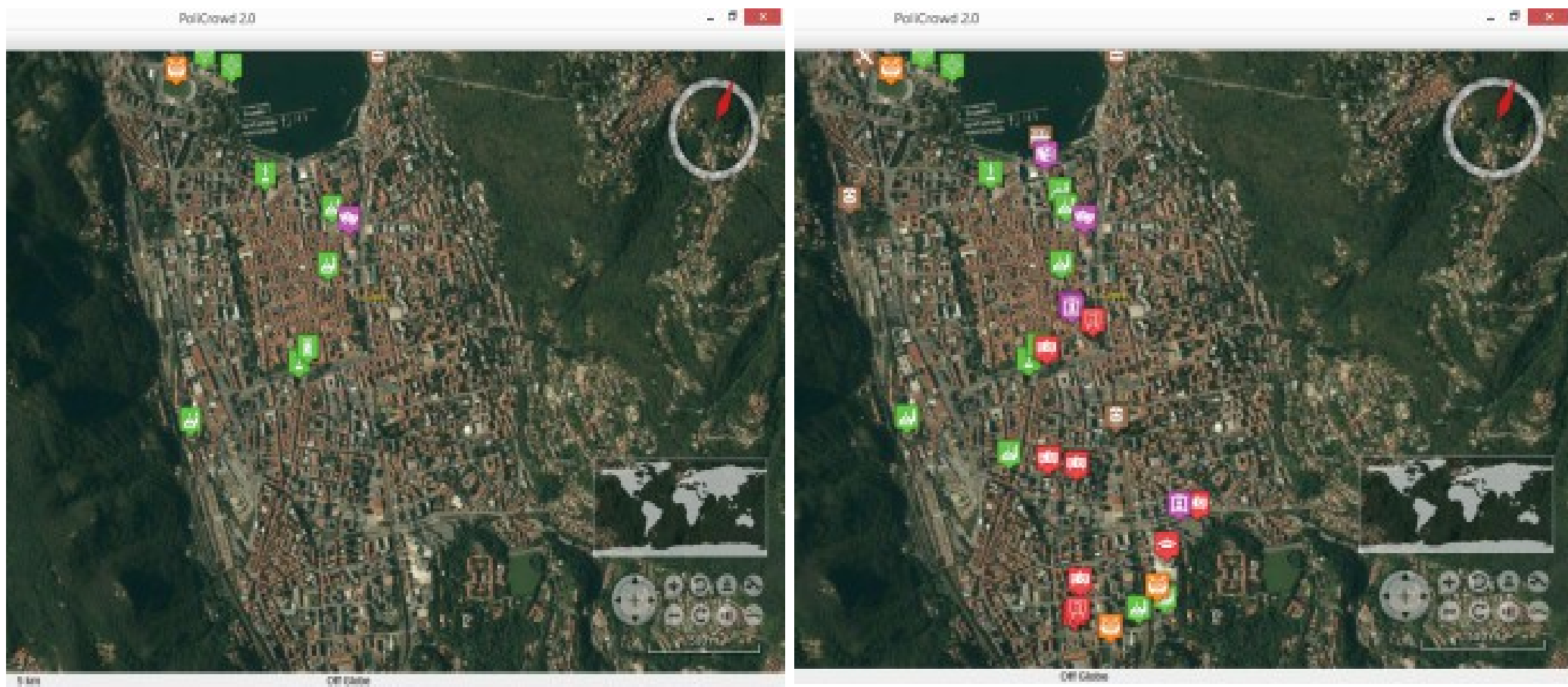
PoliCrowd 2.0: Collaborative POIs information

Every marker is open to collaborative contribution: everyone can add his POI-related textual (comments) and multimedia contents (images, audios and videos)

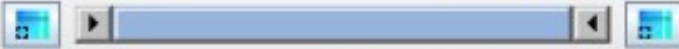
The screenshot displays the PoliCrowd 2.0 interface. On the left, a 'Layers manager' panel lists various map layers such as 'Layers', 'ODK Layers', 'Point of Interest', 'WMS Layers', 'Base Layers', and 'View controls'. Below it is a 'Filter markers' section with a 'Toggle filter' button and a date range from 'June 3, 2014' to 'June 3, 2014'. The main area is a satellite map of a city with several colored markers (red, green, orange). A 'Picture viewer' window is open in the foreground, showing two images of the 'Tempio Voltiano' building. The right-hand side features a detailed POI information panel for 'Tempio Voltiano', including a thumbnail image, metadata (Accuracy, Elevation, Latitude, Longitude, data_POI, descrir_POI, Id, imagine_POI, instanceID), and a list of user-submitted photos and comments. At the bottom of the interface, there are input fields for 'Insertion date' and 'Element date', and buttons for 'View', 'Add', 'Edit', and 'Delete'. The status bar at the very bottom shows 'Altitude 1 km', 'Lat 45.8136°', 'Lon 9.0765°', 'Elev 200 meters', and 'No Network'.



PoliCrowd 2.0: The 4th dimension (time)



Filter markers Toggle filter



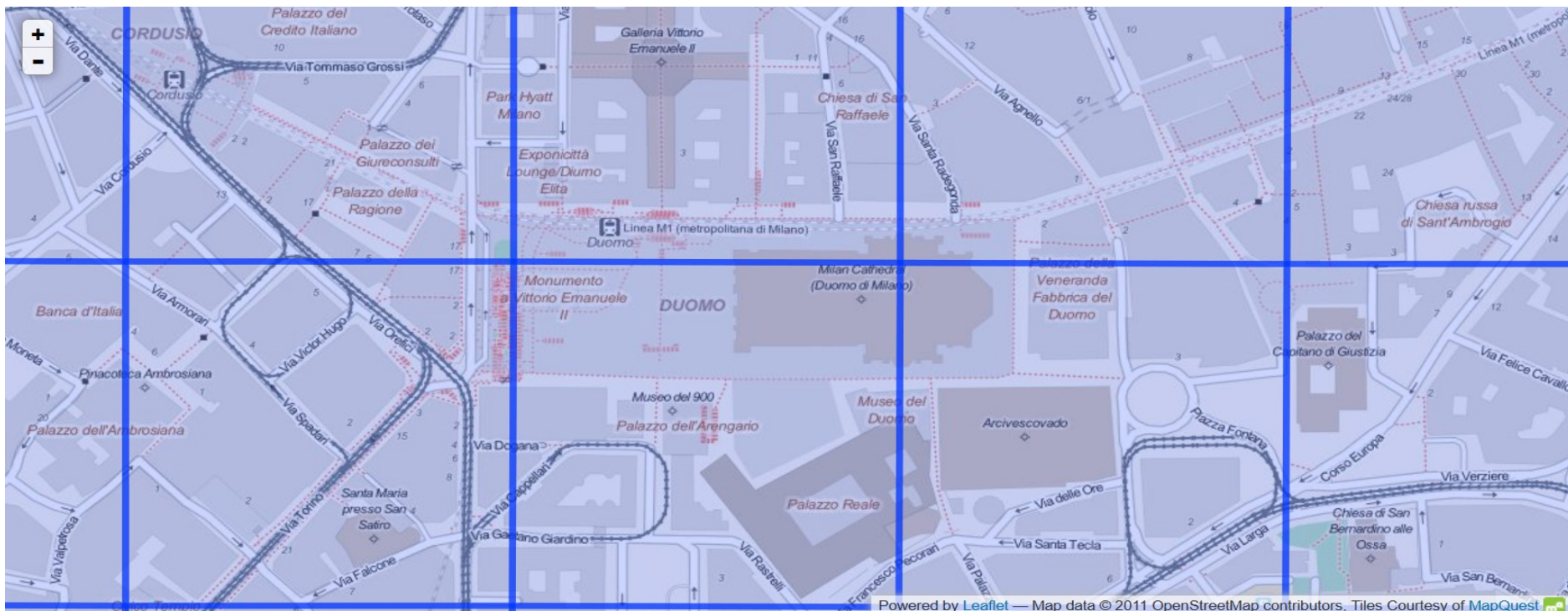
April 1, 2014 May 5, 2014



- ✓ Received SMS: a Call Detail Record (CDR) is generated each time a user receives an SMS
- ✓ Sent SMS: a CDR is generated each time a user sends an SMS
- ✓ Incoming Calls: a CDR is generated each time a user receives a call
- ✓ Outgoing Calls: CDR is generated each time a user issues a call
- ✓ Internet: a CDR is generate each time
 - a user starts an internet connection
 - a user ends an internet connection
 - during the same connection one of the following limits is reached:
 - 15 minutes from the last generated CDR
 - 5 MB from the last generated CDR
- ✓ Geolocalized Tweets (Anonymized twitter users)



- Two months of data, with a temporal step of 10 minutes
- Grid of 100 x 100 cells with size = 235 m x 235 m



<https://dandelion.eu/datamine/open-big-data/>





BigData to netCDF

Create netCDF file selecting dates and Output data

Choice one

Select start and end dates to create the netcdf.

Eventually you can select all the days inside start and end or single days in the week.

Start date

2013-11-08

End date

2013-11-10

Week day

Subsequent days

<http://landcover.como.polimi.it/BigNetCDF/>



Interactive multidimensional web visualisation EST-WA

EST-WA2D

File About

VARIABLES 3mon3sat_callout.nc

Variable	Type	Description	Unit	Rank	Domains
call_out	float			4	time level lat lon
time	double	Time	seconds since 1970-01-01 00:00:00	1	time
level	double	Days plus	days	1	level
latitude	float	Latitude	degrees_north	1	lat
longitude	float	Longitude	degrees_east	1	lon

DOMAINS

Domain	Unit	Min	Max	Size

LOAD
VIEW ATTRIBUTES
EXIT

GRIDS

Grid	Axis X	Axis Y	Axis Z	Axis T
call_out	longitude	latitude	level	time

AXIS RANGE

Axis	Min	Max	Step	Size
longitude	9.012	9.309	0.003	100
latitude	45.356	45.566	0.002	100
time	Mon Nov 04 00:00:00 ...	Mon Nov 04 23:50:00 ...	600	144
level	0	5	1	6

FILTER RANGE

Axis	Min	Max
longitude	9.012	9.309
latitude	45.356	45.566
time	Mon Nov 04 00:00:00	Mon Nov 04 23:50:00
level	0	5

Layers

- NASA Blue Marble Image
- I-cubed Landsat
- MS Virtual Earth Aerial
- Yorels
- Place Names
- World Map
- Scale bar
- Profiles
- Legend
- Compass

ZOOM TO DATA

Z SCALE

Z SHIFT

Axis X (Longitude)

MIN 9.012

MAX 9.309

Axis Y (Latitude)

MIN 45.431

MAX 45.566

Axis Z (Days plus)

MIN 0

MAX 5

Axis T (Time)

MIN v 04 00:00 2013

MAX 1 03:40:00 2013

Filtering



EST-WA3D (3mon3sat_callout.nc)

Legend

Altitude 16 km Lat 45.3845° Lon 9.2090° Elev 0 meters



Web World Wind is a 3D virtual globe API for HTML5 and JavaScript.

It is a library and API rather than a stand-alone application. This enables it to be included in any web page or web application as a component.



Eye 13,163 km





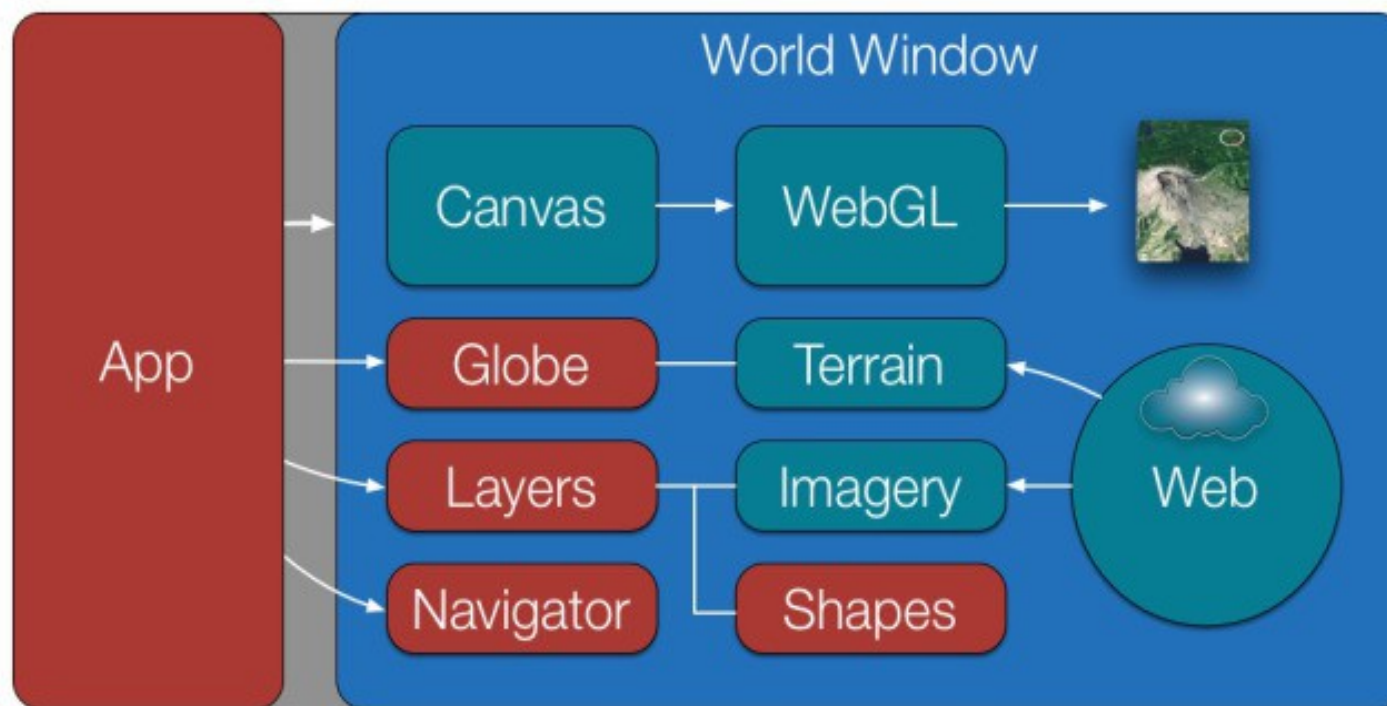
How does it work?

It has a WebGL internal core but provides a javascript interface to operate with it

WWW is open source and available to download on github:

- <https://github.com/NASAWorldWind/WebWorldWind>

where also is possible to try different examples.



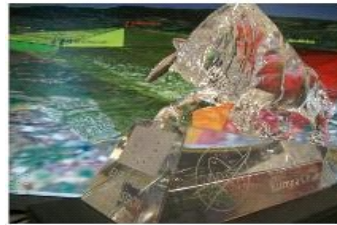
red objects
=
the parts
accessible from
the APIs



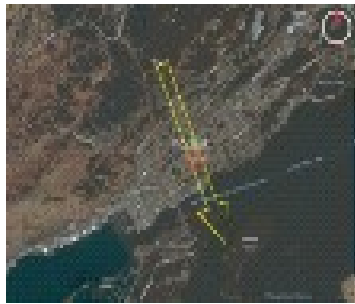
How does it work?

- High-resolution terrain and imagery, retrieved from remote servers
- Layers: they contain all the information displayed in the World Window. All imagery, shapes and decorations such as the compass are defined in layers.
- Supports REST, WMS and Bing
- Display multiple globes and maps on the same page

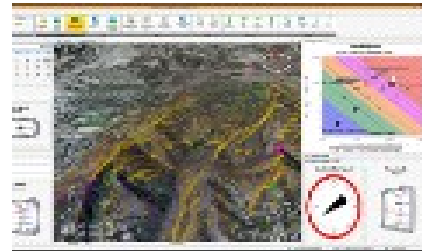




<http://eurochallenge.como.polimi.it>



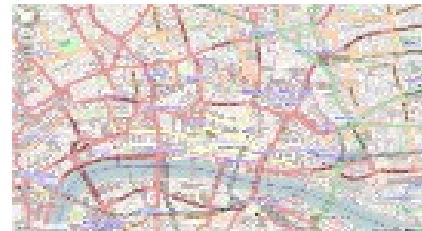
Global earthquake forecast system
Trillium Learning & Kodiak Island Borough District



Wildfire management tool
EMXSYS



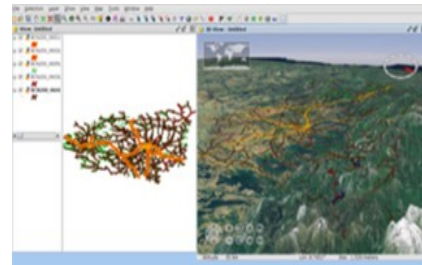
LiDAR data visualisation and analysis
University of Kansas



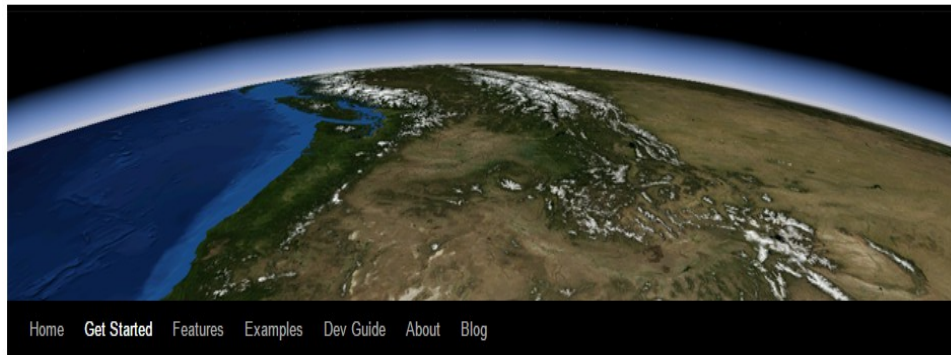
wwwOSM
Trilogis srl



GeoSim cloud-based 5D visualisation
University of Denver



gvSIG 3D
gvSIG Association



Get Started

It's very easy to get started using Web World Wind. There's nothing to download. You simply include a short script in an HTML page, as in this example:

```
<!DOCTYPE html>
<!-- This is a very simple example of using Web World Wind. -->
<html>
<head lang="en">
  <meta charset="UTF-8">
  <title>World Wind Example</title>
```


Topics

- Get Started
- Features
- Examples
- Developer's Guide
 - Common Problems
 - Concepts
 - World Window
 - Event and Gesture Handling
 - Navigation and Viewing
 - Picking
 - Layers

14th October 2015, Scientific Communication and Visualisation Session(C1A) NASA World Wind, World Data Viewer

On the web world wind website a starting guide is available:

- <http://webworldwind.org/get-started/>

You can find a developer's guide, where there are some tutorials on how to use the basic functionalities of WWW:

- <http://webworldwind.org/developers-guide>