I CAMMINI DELLA REGINA
percorsi transfrontalieri legati alla Via Regina

THE PATHS OF REGINA
Promoting slow tourism through FOSS4G Web Mapping: an Italian-Swiss case study

Milan Antonovic[1], Maria Antonia Brovelli[2], Massimiliano Cannata[1], Mirko Cardoso[1], Candan Eylül Kilsedar[2], Marco Minghini[2], Giorgio Zamboni[2]
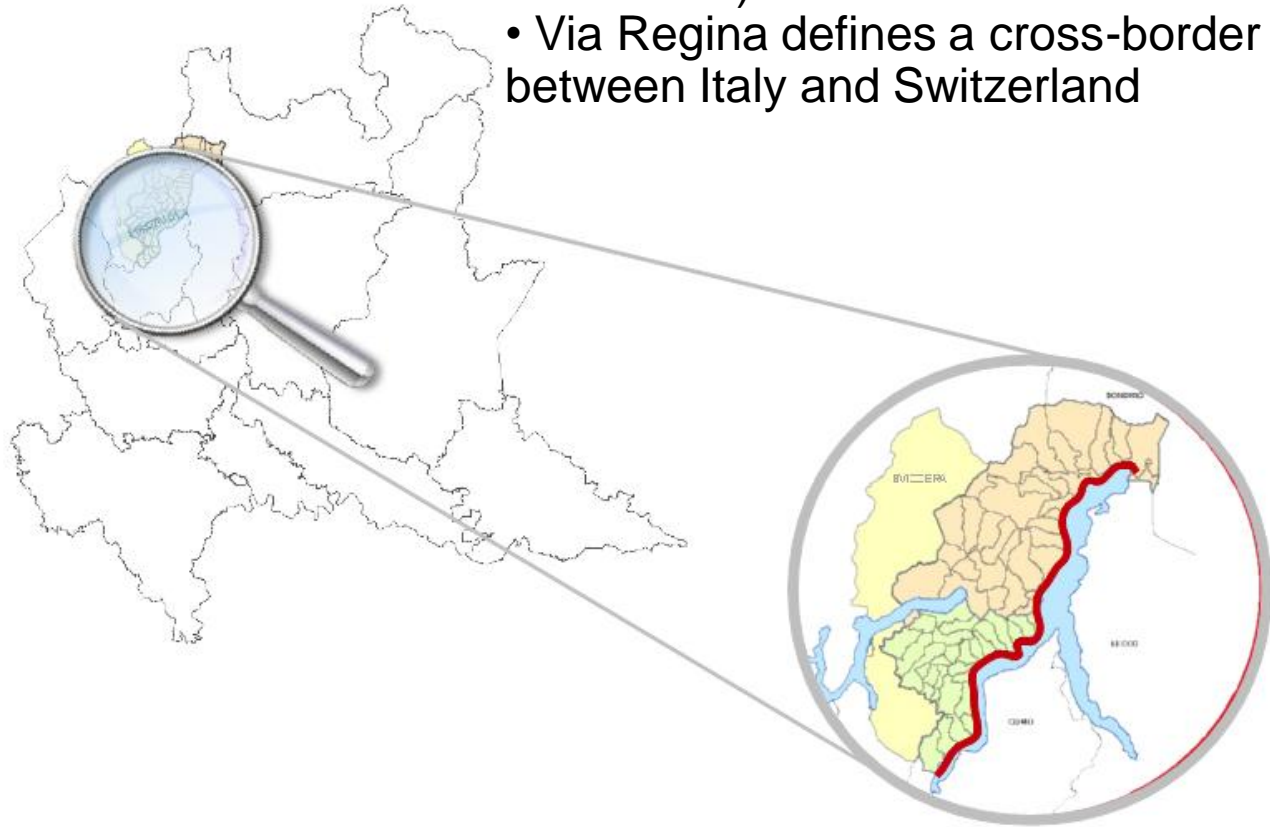
[1] Institute of Earth Sciences, SUPSI, Campus Trevano, 6952 Canobbio, Switzerland
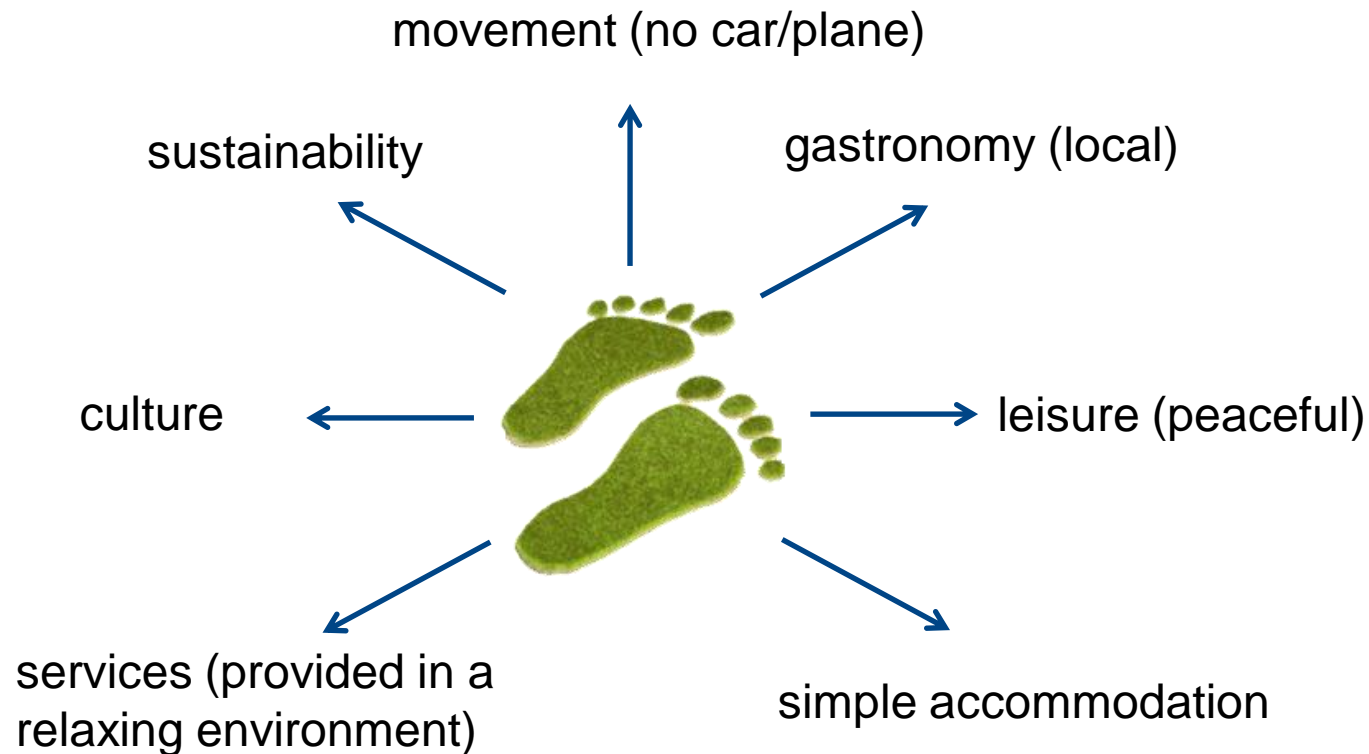[2] Politecnico di Milano, Como Campus, DICA, Via Valleggio 11, 22100, Como, Italy

• *The Paths of Regina* is an INTERREG project (Cross-border Cooperation Operational Programme Italy-Switzerland 2007-2013)
• Via Regina defines a cross-border area between Italy and Switzerland

I CAMMINI DELLA REGINA
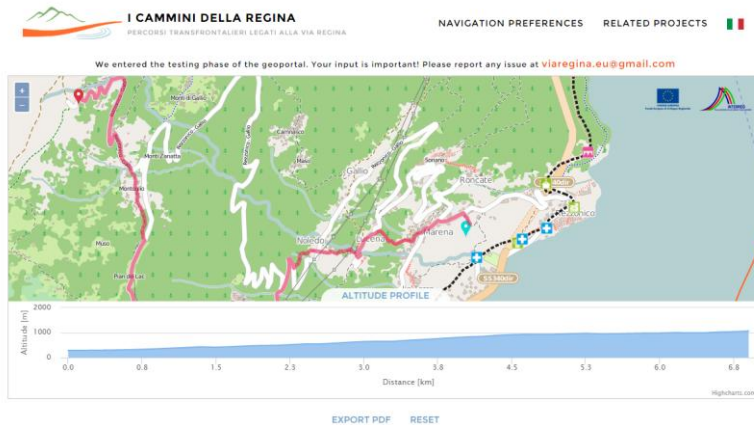percorsi transfrontalieri legati alla Via Regina

• Slow tourism (a special kind of sustainable tourism) involves:

  • environmental friendliness
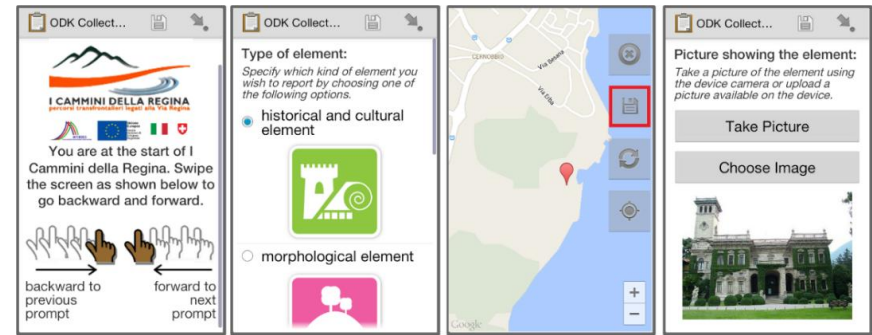
  • rediscovery of local traditions and cultural knowledge

movement (no car/plane)

sustainability   gastronomy (local)

culture   leisure (peaceful)

services (provided in a
relaxing environment)

simple accommodation

The Paths of Regina

- Within the project 5 applications have been developed:

2D Web viewer
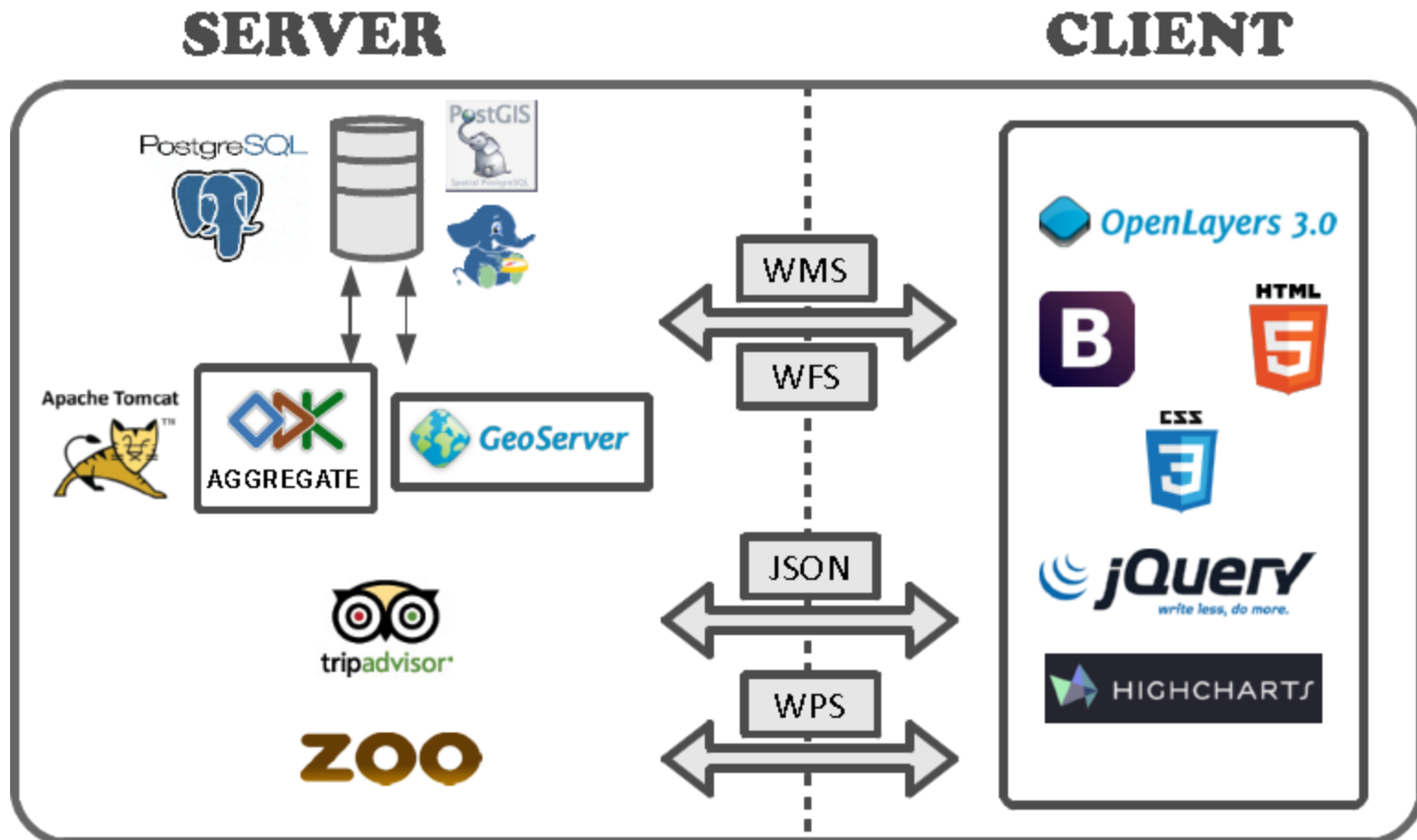

Mobile app for slow tourists

3D Web Viewer
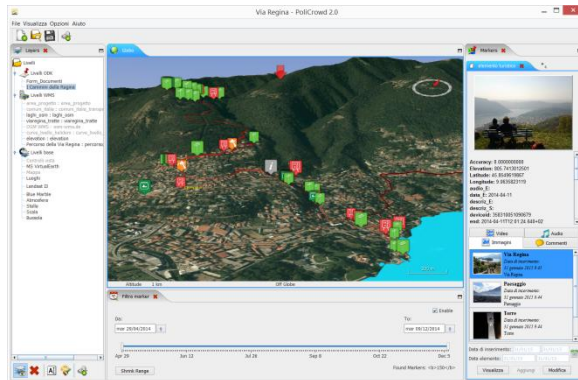
Virtual tour application
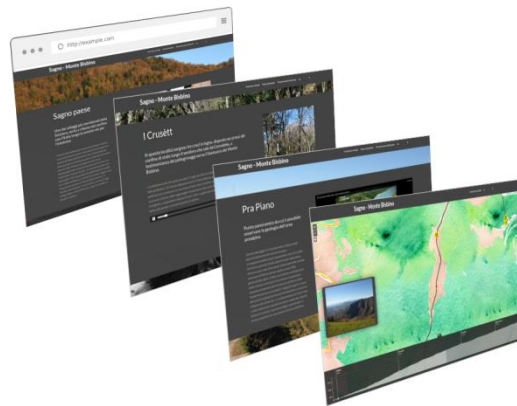
Mobile app for professionals

I CAMMINI DELLA REGINA
percorsi transfrontalieri legati alla Via Regina

2D Web viewer

- Link: http://viaregina3.como.polimi.it/ViaRegina/

2D Web viewer

- Main 2D viewer of the project with advanced functionalities:

  - Calculation of the route based on user input about the types of POIs

- Link: http://viaregina3.como.polimi.it/ViaRegina/

2D Web viewer
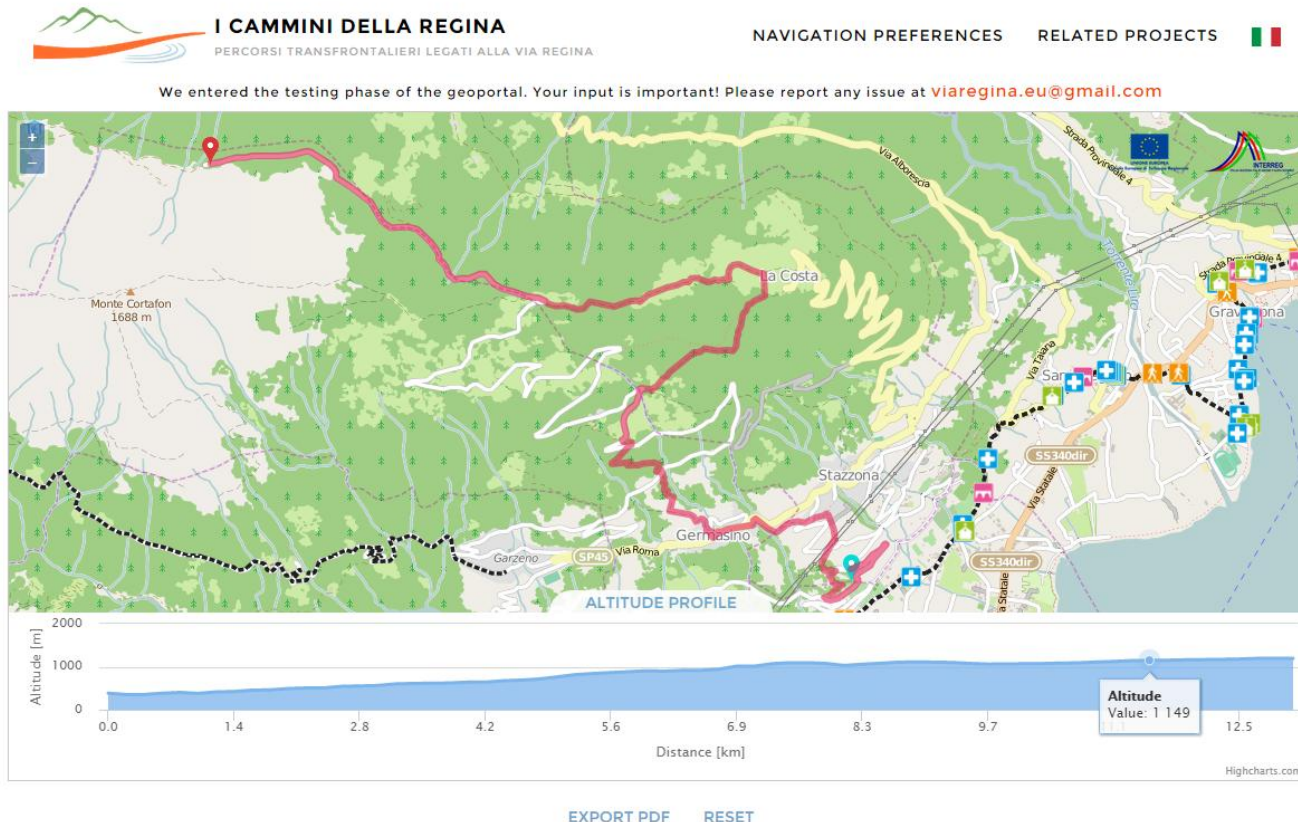
- Main 2D viewer of the project with advanced functionalities:

  - Calculation of the route based on user input about the types of POIs

- Link: http://viaregina3.como.polimi.it/ViaRegina/

2D Web viewer
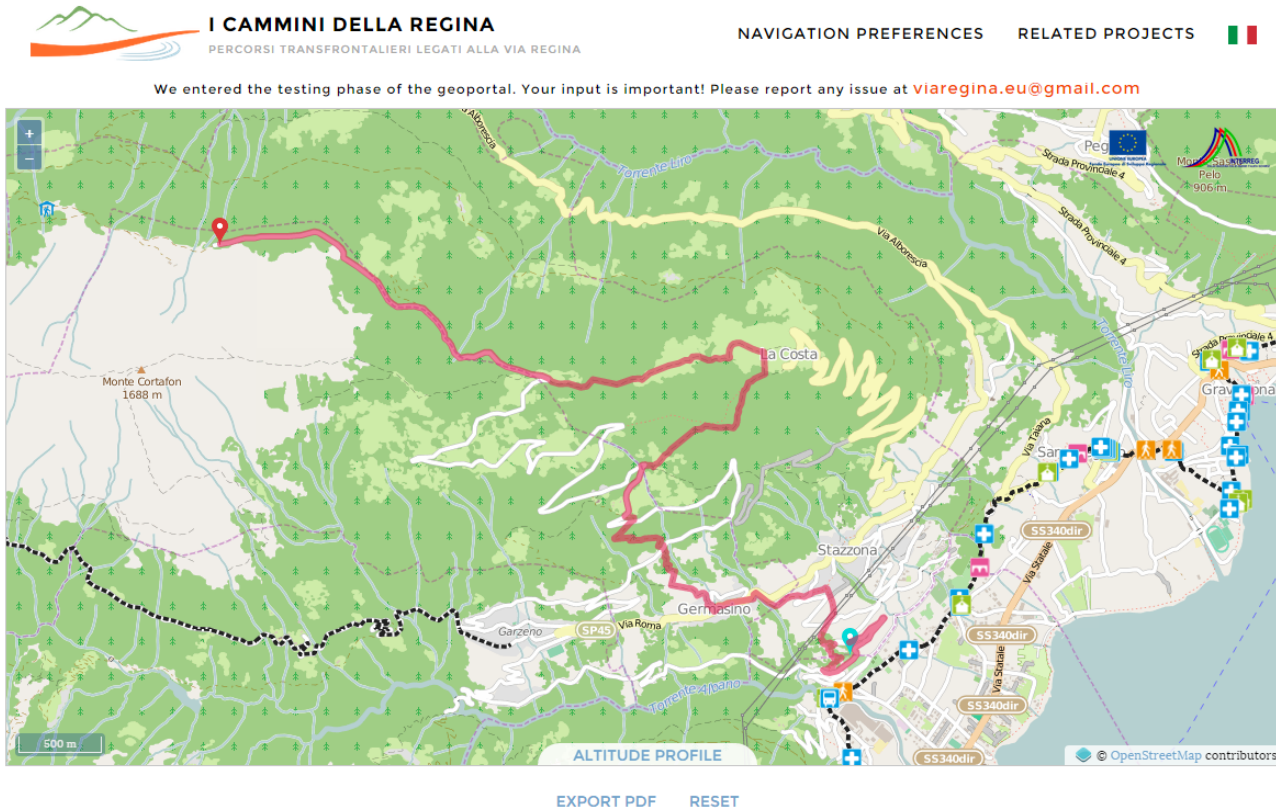
- Main 2D viewer of the project with advanced functionalities:

- Calculation of the terrain profile of this route

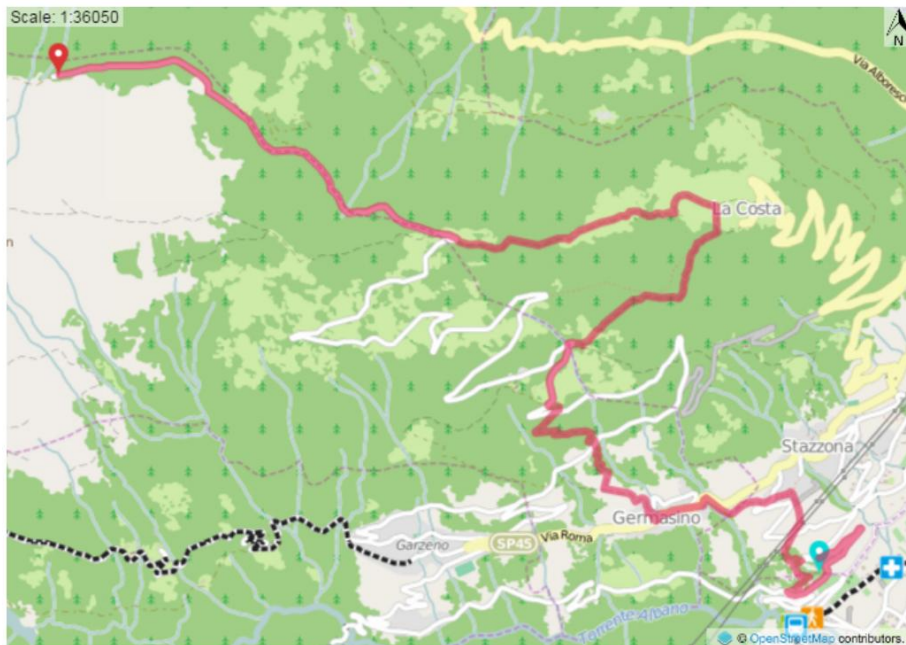- Link: http://viaregina3.como.polimi.it/ViaRegina/
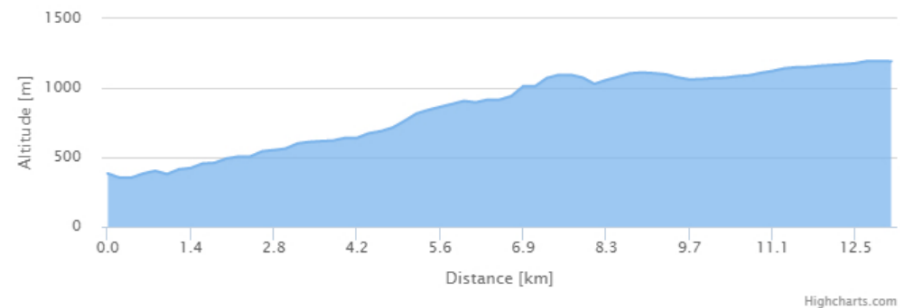
2D Web viewer

- Main 2D viewer of the project with advanced functionalities:

  - Exporting the route, the terrain profile and additional information

Your path

www.viaregina.eu

Scale: 1:36050

Altitude profile

Total 2D distance: 13.3 km
Total 3D distance: 13.47 km
Average slope: 11.60%
Up height: 989 m
Down height: 180 m
Height difference: 809 m

- Link: http://viaregina3.como.polimi.it/ViaRegina/

I CAMMINI DELLA REGINA
percorsi transfrontalieri legati alla Via Regina

2D Web viewer

- Main 2D viewer of the project with advanced functionalities:

  - Integration with TripAdvisor data

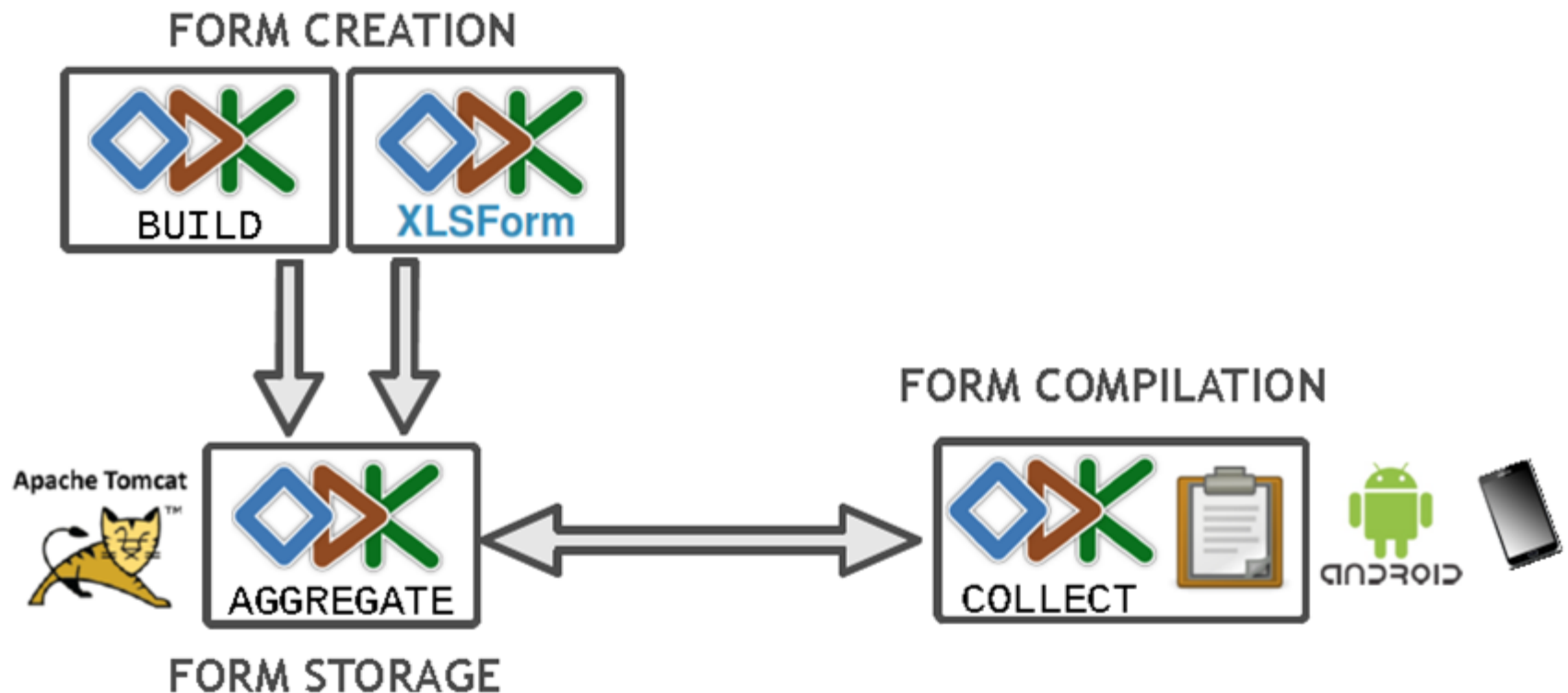   - Getting information about hotels, restaurants and attractions around clicked point

- Link: http://viaregina3.como.polimi.it/ViaRegina/
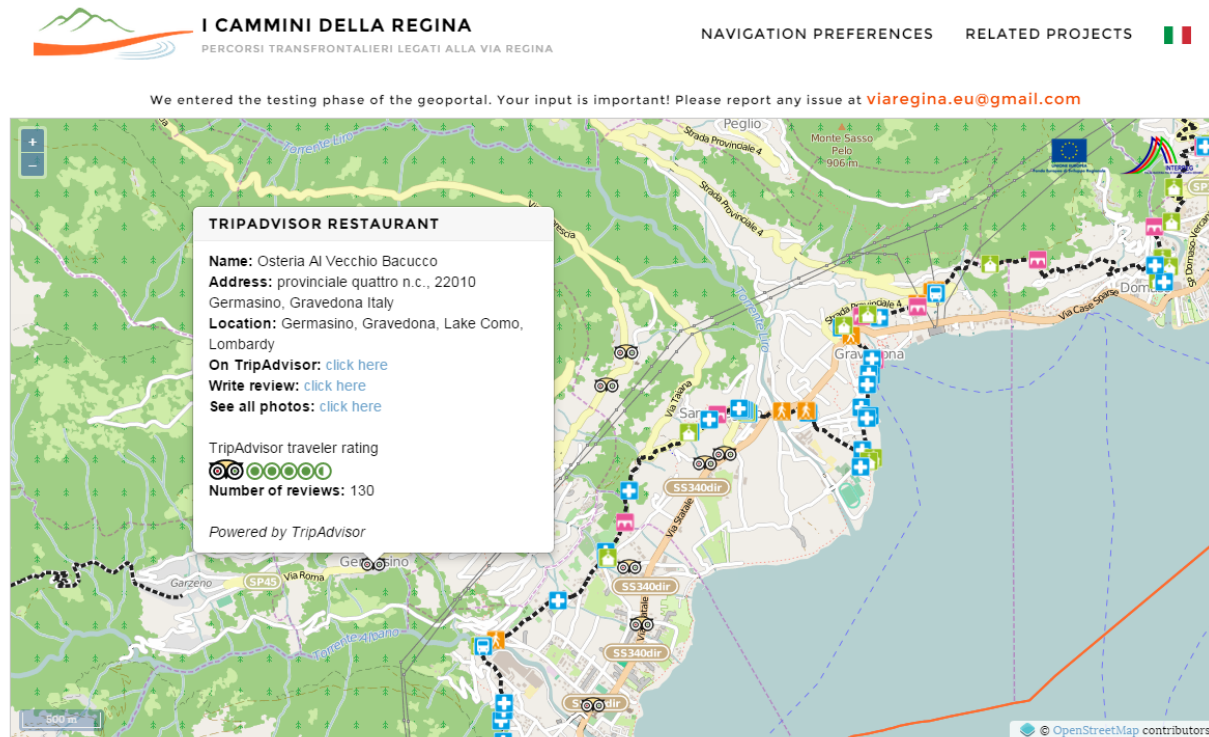
Mobile app for slow tourists

- Based on the suite of tools **ODK** OPEN DATA KIT

  - management of mobile data collection through a set of related applications

Mobile app for slow tourists

- Everyone can report Points of Interests (POIs) through an Android application.

- The categories of POIs are as follows:

HISTORICAL AND CULTURAL ELEMENTS

- Museum
    - ethnographic
    - thematic
    - gallery
    - collections
- Religious Building
    - church
    - oratory
    - sanctuary
    - chapel
    - via crucis
    - fresco
    - abbey
- Civil Building
    - historical building
    - contemporary building
    - traditional building
    - monument

- Rural Building
    - pasture/shed
    - snow deposit
    - graa/metato (chestnuts drier building)
    - roccolo (system designed to catch birds)
    - casello/turbino (buildings for the storage of perishable foods
    - hydraulic structures
    - masseria (farm)
- Archeological Element
    - archeological element
    - archeological site
    - element inside a building
    - single element

Mobile app for slow tourists

HISTORICAL AND CULTURAL ELEMENTS

- Military Building
    - castle
    - Tower
    - defensive wall
    - fort
    - trench
    - redoubt (secondary fort)
    - bunker
- Factory
    - furnace
    - trip hammer
    - mill
    - sawmill
    - quarry
    - mine
    - rural factory

MORPHOLOGICAL ELEMENTS

- Surface
    - pavement
    - natural material
    - gravel
    - asphalt
    - steps
    - ford

I CAMMINI DELLA REGINA
percorsi transfrontalieri legati alla Via Regina

Mobile app for slow tourists

MORPHOLOGICAL ELEMENTS

- Bounding Escarpment
    - rock
    - ground escarpments
    - rock escarpments
    - support walls
    - boundary walls and railings
    - tree-lined avenues
    - fence/barrier
    - vertical plate
- Traffic Support and Manufactured Products
    - kilometric stone
    - border stone
    - stone marker
    - isolated tree
    - inscription
    - fountain
    - ancient laundary
    - bridge
    - rest of bridge
    - tomb
    - underpass
    - tunnel
    - panoramic viewpoint

I CAMMINI DELLA REGINA
percorsi transfrontalieri legati alla Via Regina

Mobile app for slow tourists

TOURIST ELEMENTS

- Accommodation
  - hotel
  - hostel
  - B&B
  - hut/shelter
  - camping
  - private accomodation
  - free accommodation
  - agritourism
  - apartment
- Transport
  - bus stop
  - dock/ferry
  - Train station
  - funicular and ski lift
- Products
  - Wine shop
  - craft
  - food/typical products
  - clothing shop

- Services
  - pharmacy
  - parking
  - school
  - public safety
  - spring
  - city hall
  - post office
  - wc
  - bank
  - park area
  - ATM
  - info point
  - wifi hotspot
  - bike sharing
  - electric car charging point
  - hospitals/emergency room
  - hiking signs
- Food Service
  - restaurant
  - crotto (cellar inside a natural curve)
  - bar
  - food shop

I CAMMINI DELLA REGINA
percorsi transfrontalieri legati alla Via Regina

CRITICAL ELEMENTS

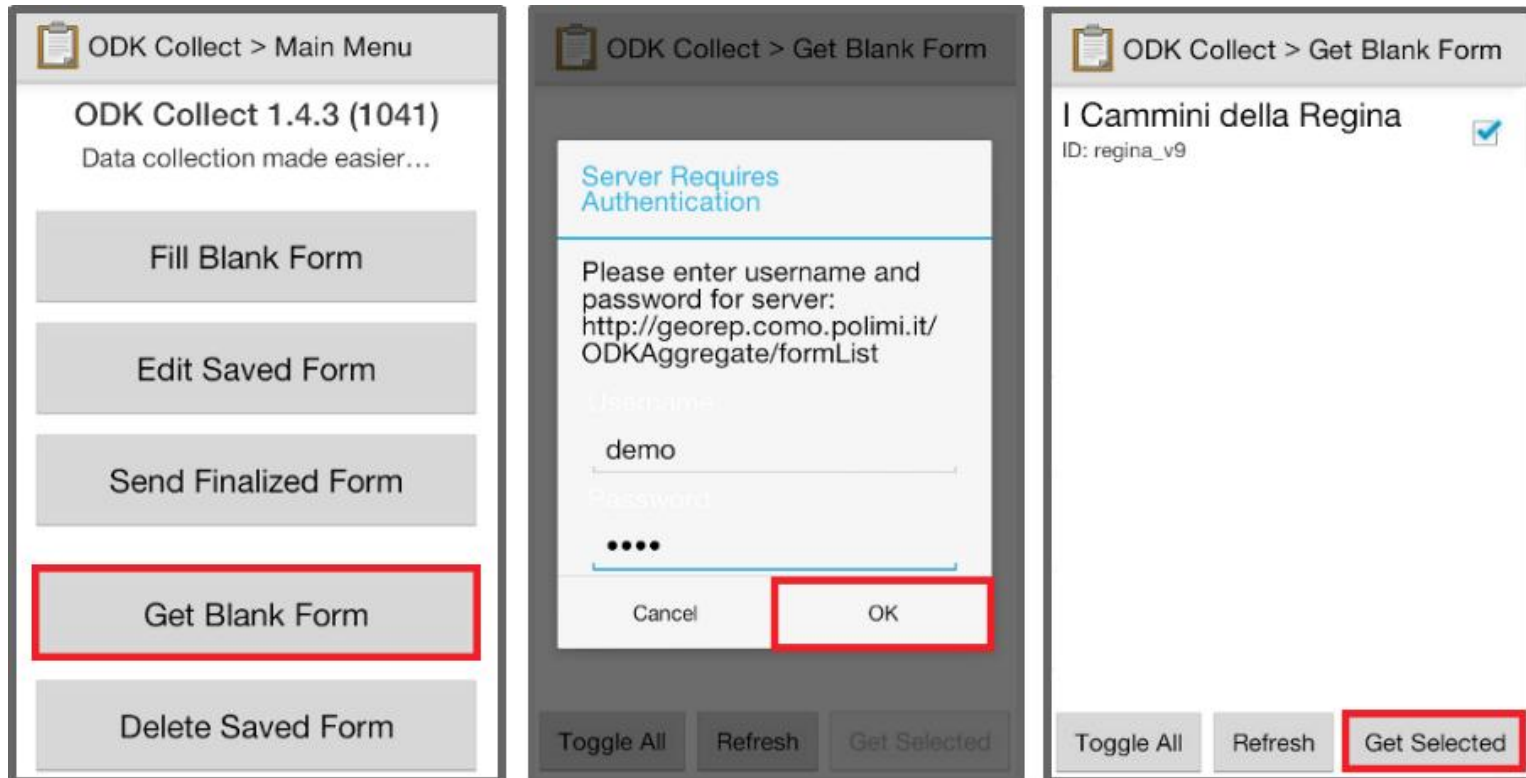- Morphological
  - ford
  - landslide
- Structural
  - crossing with traffic light
  - crossing without crossing stripes
  - crossing with crossing stripes

WARNING

- [whatever kind of warning user specifies]

Mobile app for slow tourists
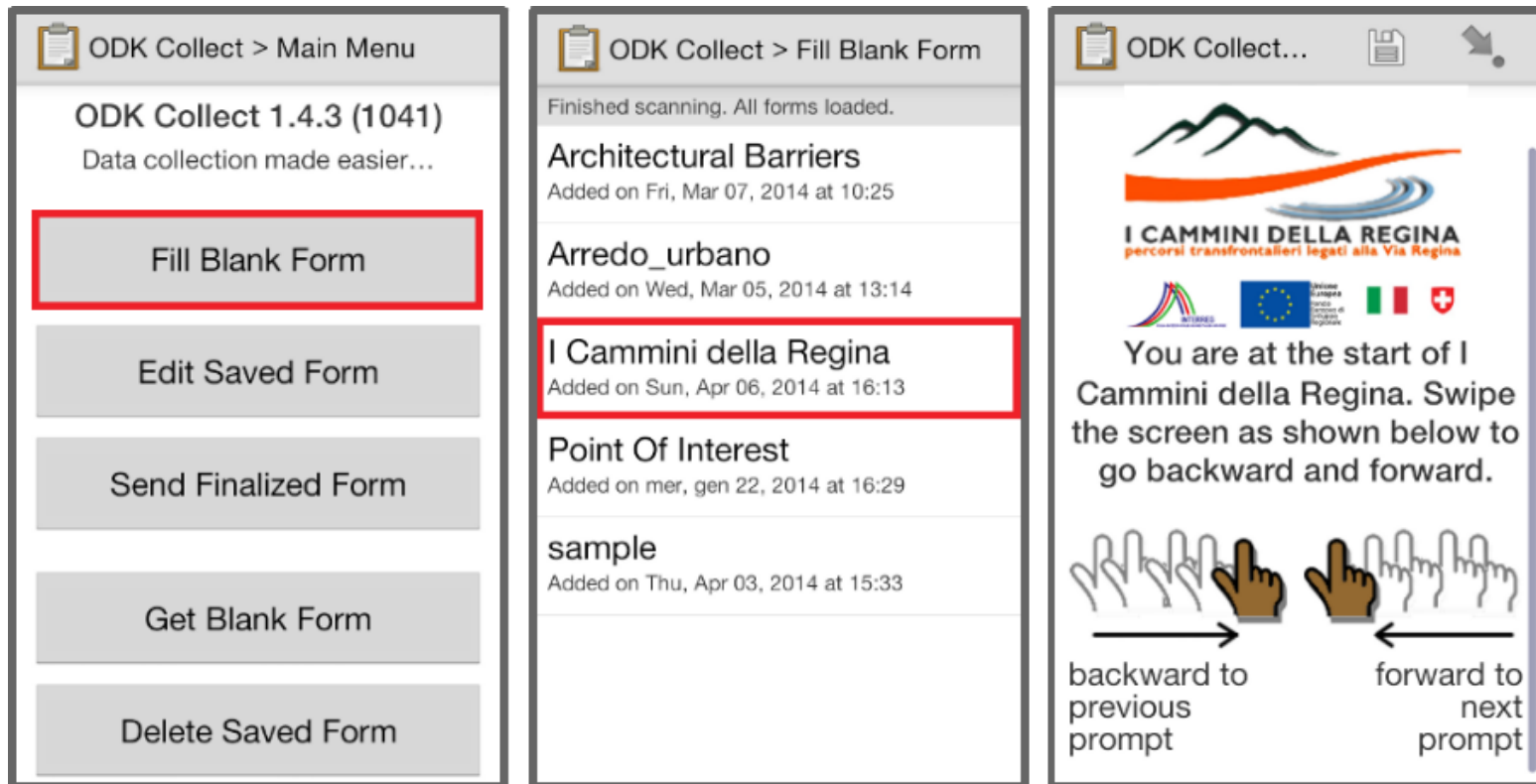
- Form download & compilation

- Detailed instructions:
  http://www.viaregina.eu/files/documenti/2014/istruzioni_eng.pdf

I CAMMINI DELLA REGINA
percorsi transfrontalieri legati alla Via Regina

Mobile app for slow tourists

- Form download & compilation

- Detailed instructions:
  http://www.viaregina.eu/files/documenti/2014/istruzioni_eng.pdf

Mobile app for slow tourists

- Form download & compilation

- Detailed instructions:
  http://www.viaregina.eu/files/documenti/2014/istruzioni_eng.pdf

Mobile app for slow tourists

- Form download & compilation

- Detailed instructions:
  http://www.viaregina.eu/files/documenti/2014/istruzioni_eng.pdf

Mobile app for slow tourists

- Form download & compilation

- Detailed instructions:
  http://www.viaregina.eu/files/documenti/2014/istruzioni_eng.pdf

Mobile app for slow tourists

- Form download & compilation

- Detailed instructions:
  http://www.viaregina.eu/files/documenti/2014/istruzioni_eng.pdf

Mobile app for slow tourists

- Form download & compilation
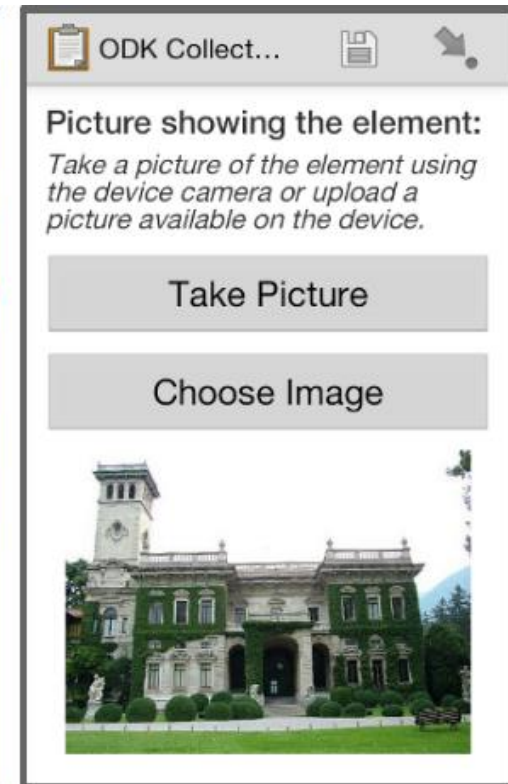

- Detailed instructions:
  http://www.viaregina.eu/files/documenti/2014/istruzioni_eng.pdf
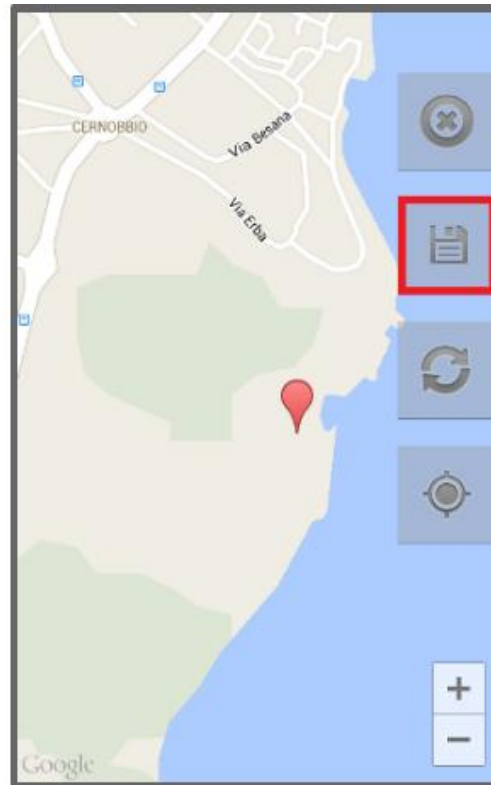
Mobile app for slow tourists – Mapping Party

- Collected data can be seen in MapParty WebGIS

http://www.viaregina.como.polimi.it/mapparty

3D Web viewer

http://www.viaregina2.como.polimi.it/ViaRegina2.0/ViaRegina20.jnlp
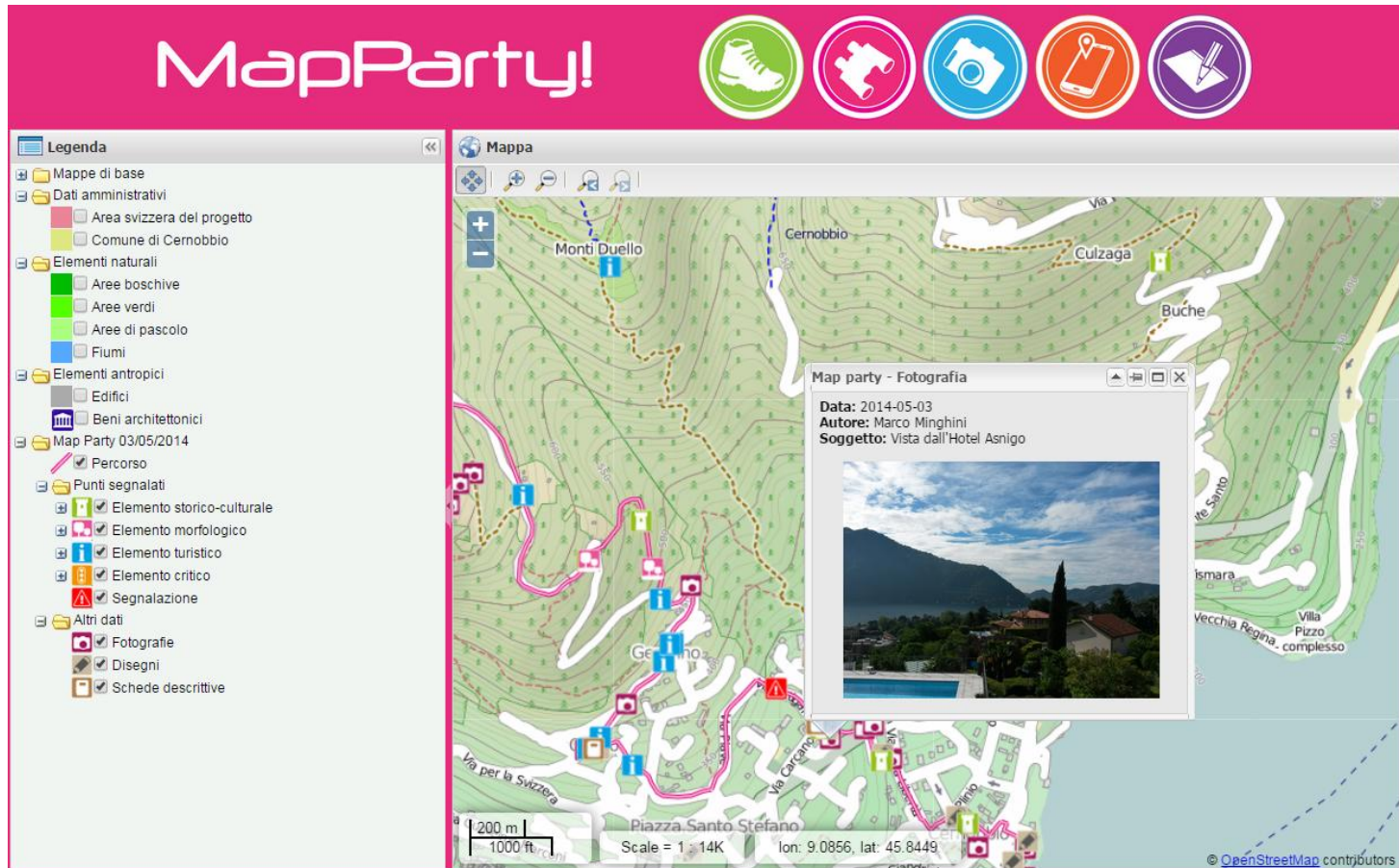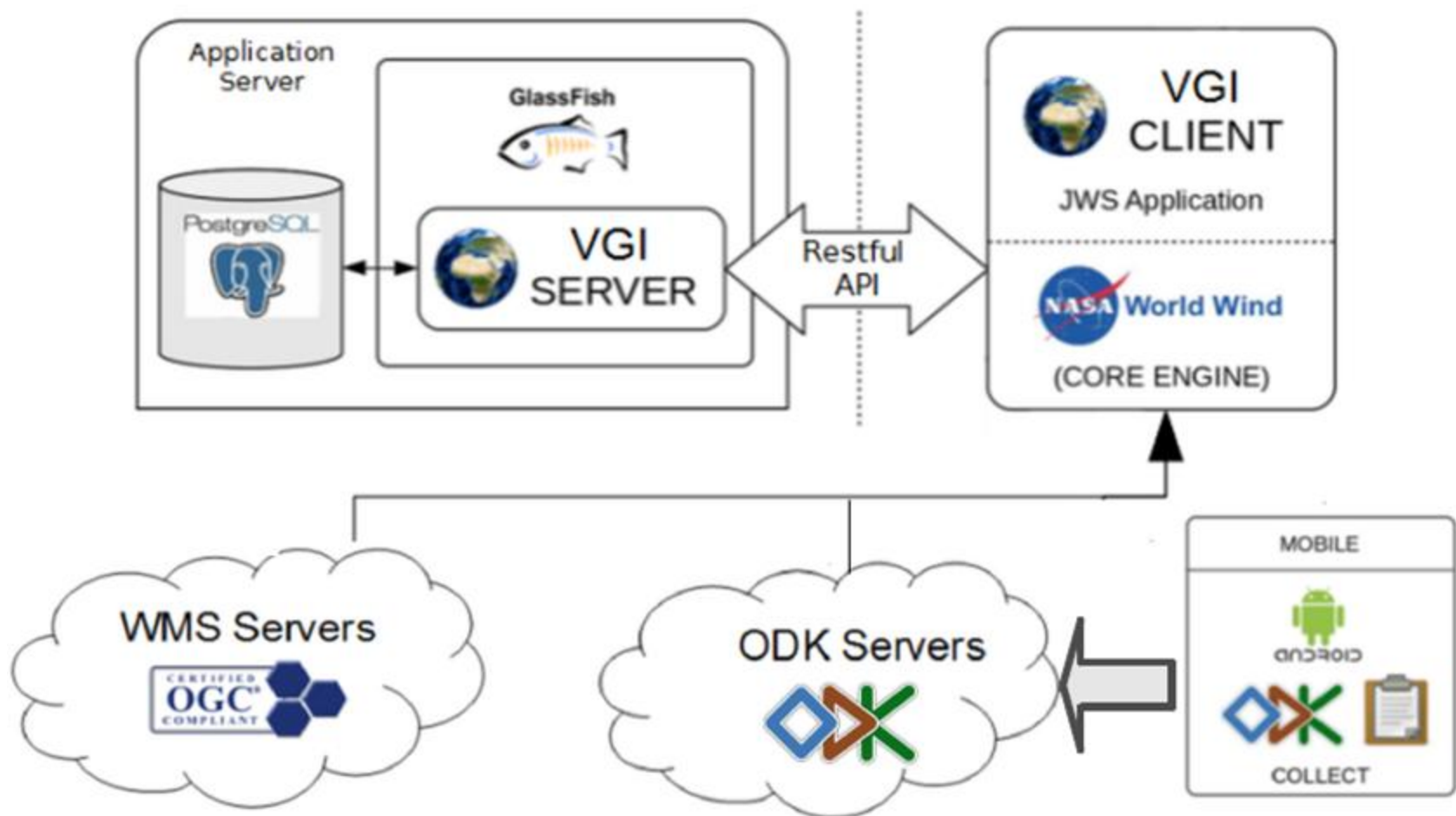
3D Web viewer

- Connection to WMSs (including the project servers)
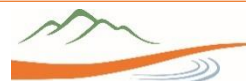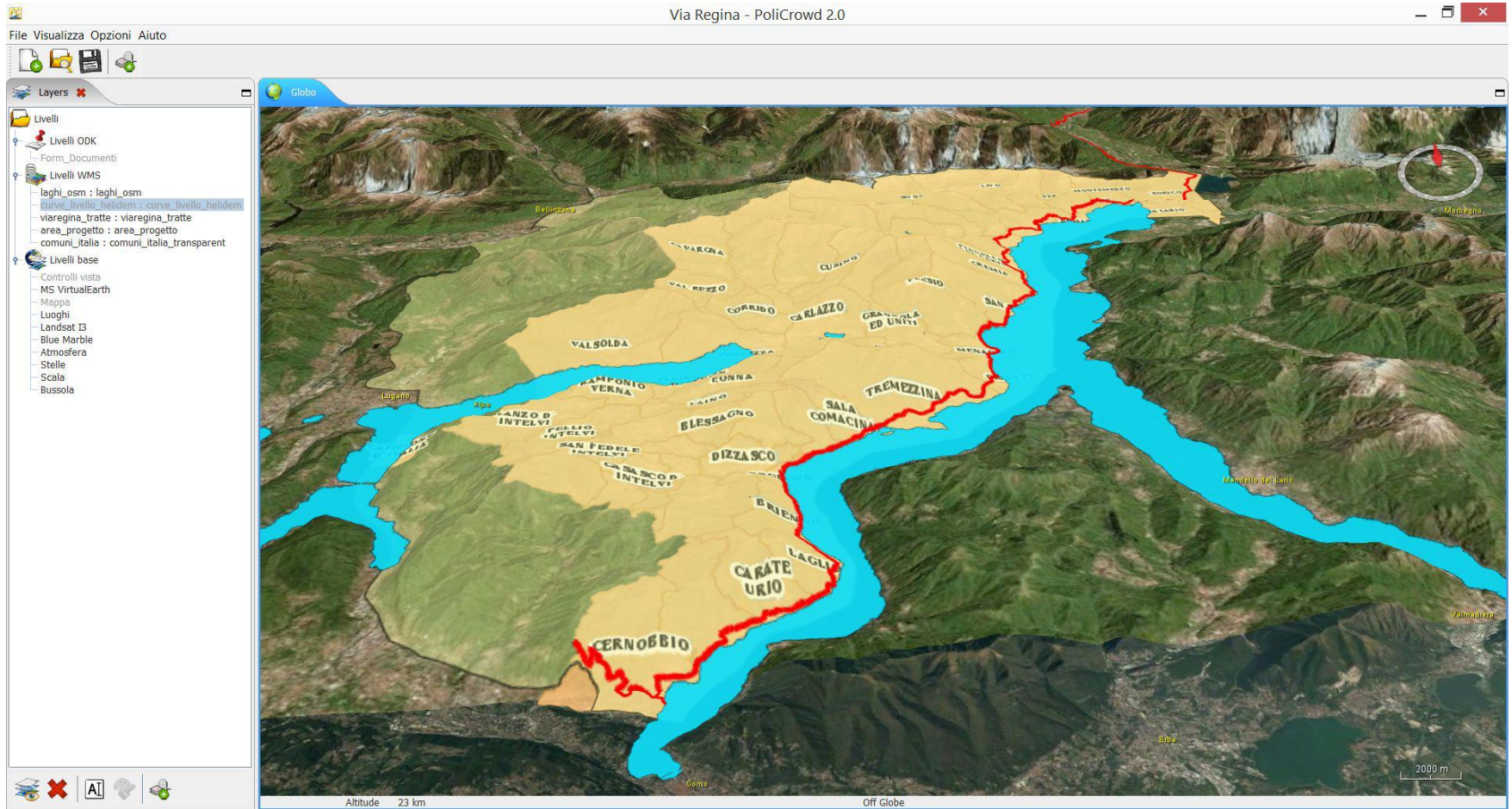
3D Web viewer

- Connection to ODK servers (including the project servers)
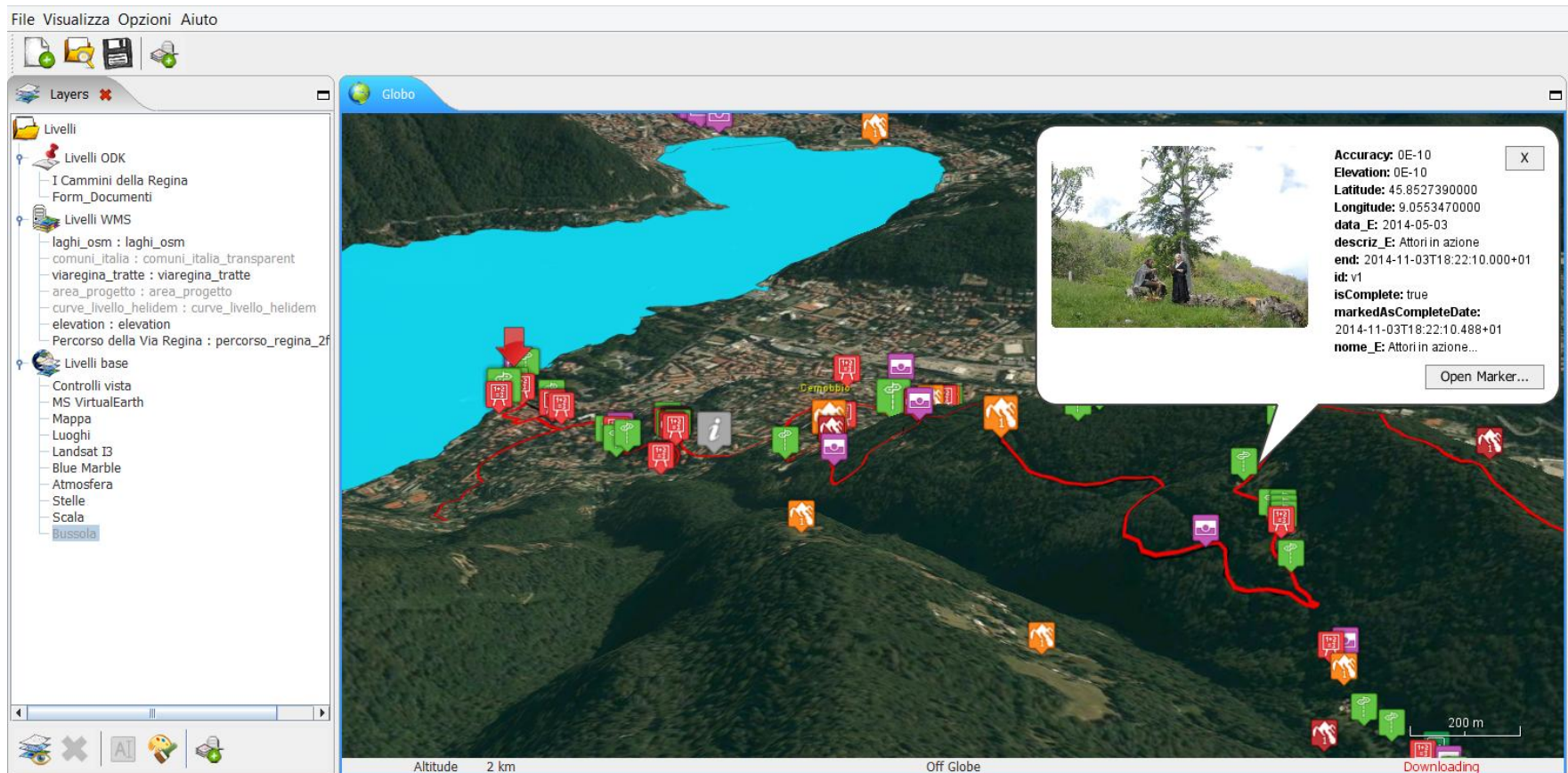
3D Web viewer

- Query of the ODK data and possibility of enriching the database with additional content (photos, videos, documents & notes)
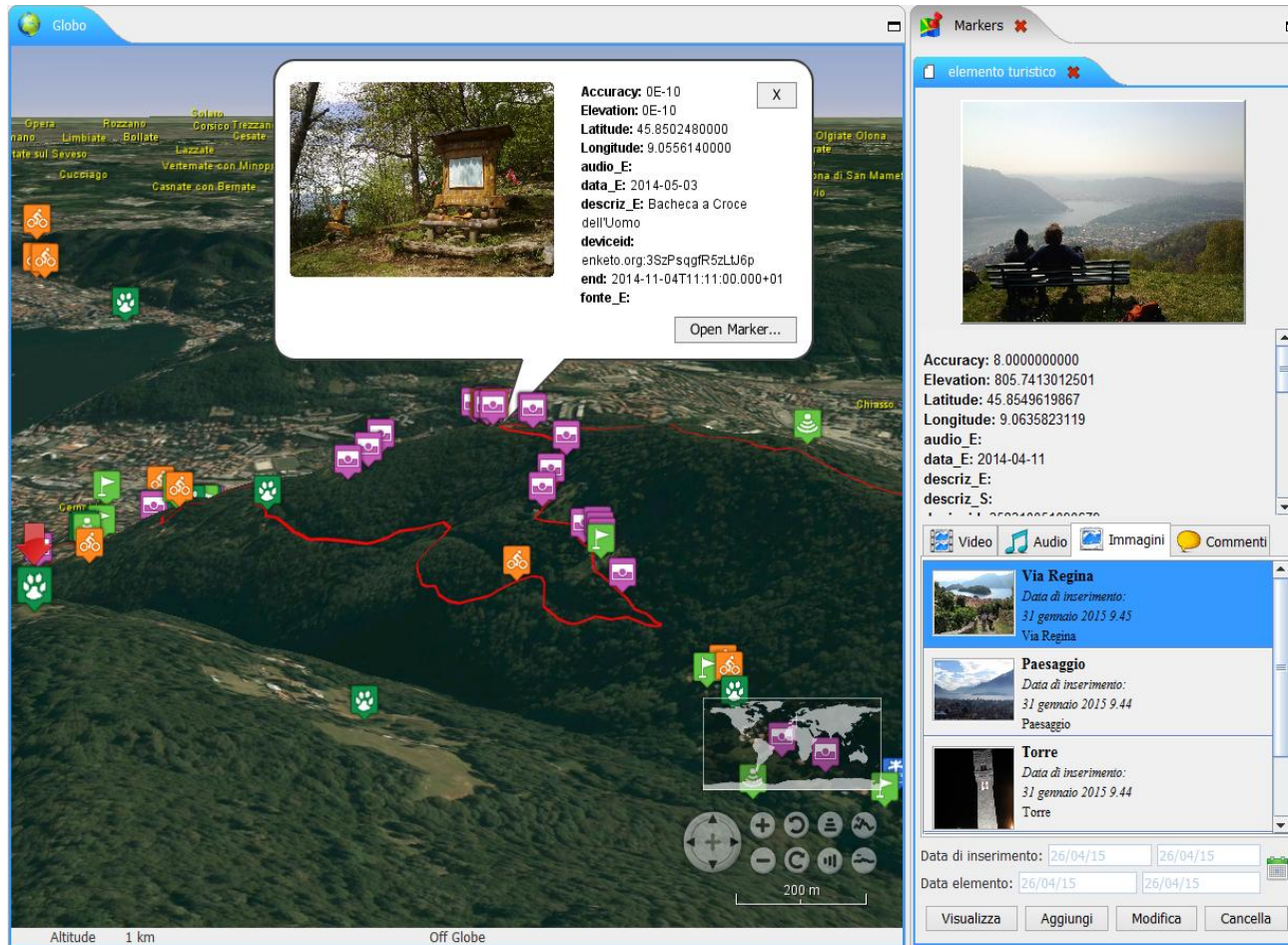
Cultural tourism

Tangible and intangible heritage

(Cultural Tourism Industry Group, http://www.culturaltourismvictoria.com.au/)

"Cultural tourism is an entertainment and educational experience that combines the arts with natural and social heritage and history."

Picture by Massimiliano Cannata

- promote the diffusion of the knowledge

- protect the territory

- foster the tourism

Environmental and cultural understanding of the territory passed through is the triggers to reach the objectives.

- Extensive usage of Free and Open Source with Geospatial technologies as a mainstream

I CAMMINI DELLA REGINA
percorsi transfrontalieri legati alla Via Regina
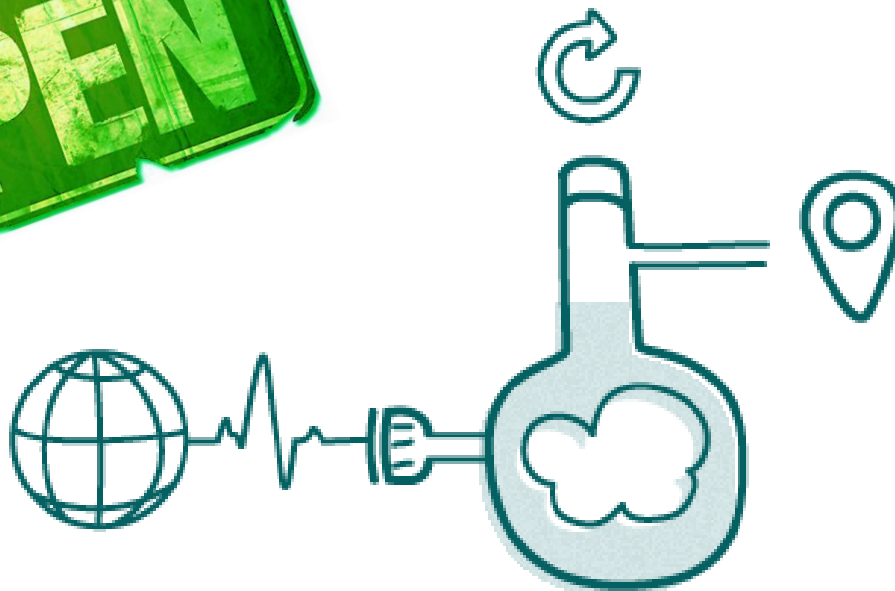
Integrated multidisciplinary development

Geoinformation experts

Communication and design experts

Geomorphology, history, ethnography experts
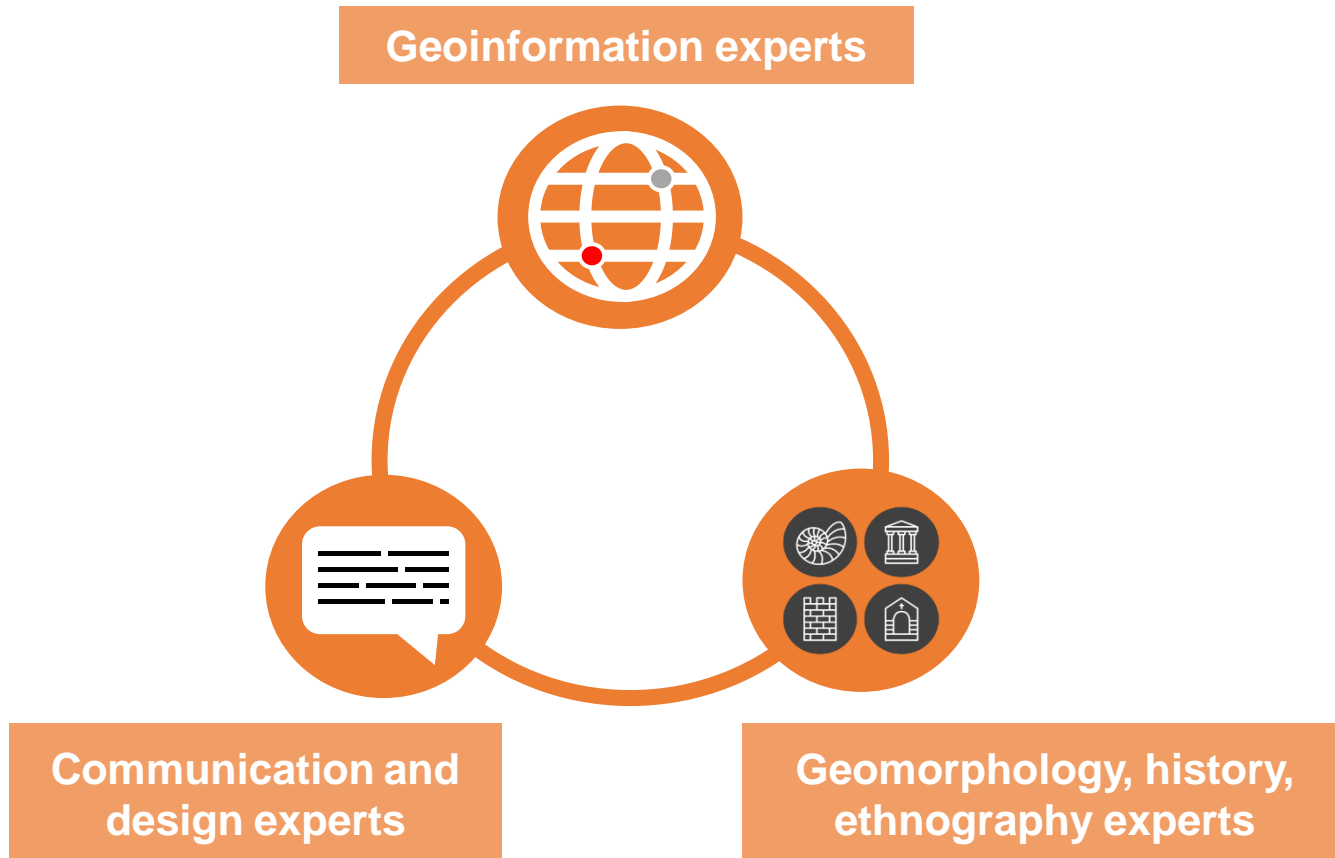
- Concept, design and development of two distinct applications for two different scopes

Protect the territory and

support landuse planning

GeoIVS

Valorization of landscape,

historical and

cultural heritage

Transguardi Web

I CAMMINI DELLA REGINA
percorsi transfrontalieri legati alla Via Regina

GeoIVS

- Practical solution to support the survey and management of data for the cultural routes: mobile application.
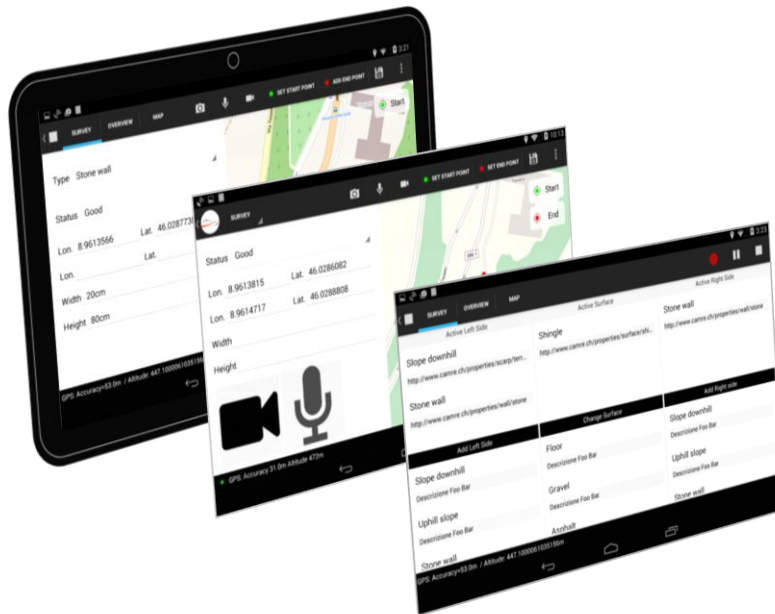
FOSS Technologies

- Android

- Couchdb lite

- JTS Java Topology Suite

- JSON

- GeoJSON

- OpenLayers3

- Proj4js

I CAMMINI DELLA REGINA
percorsi transfrontalieri legati alla Via Regina

ivs
Inventar historischer Verkehrswege der Schweiz
Inventaire des voies de communication historiques de la Suisse
Inventario delle vie di comunicazione storiche della Svizzera
Inventari da las vias da communicaziun istoricas da la Svizra

- Land planning and heritage protection

- Allocate funds for maintenance

Surface

◇◇◇◇◇ rocks
•—•—• natural
○○○○○ gravel
▢▢▢▢▢ pavement
•▮•▮• asphalt
≻≻≻≻≻ steps

Morphology

⊤⊤⊤⊤ terrain slope
▾▾▾▾ rock slope
▮▮▮▮ retaining wall
▬▬▬ parapet
●●●●● hedge, trees
▲ kerbstone
ᜭᜭᜭ vertical planks
×—×—× fance

Artefact

⊩⊩ bridge
▫ ⊩ ruin of bridge
→ tubin
⊩▯▯⊩ tunnel

ometti
TI 2342
TI 2343.0.3
pietra di confine
casotti dogan
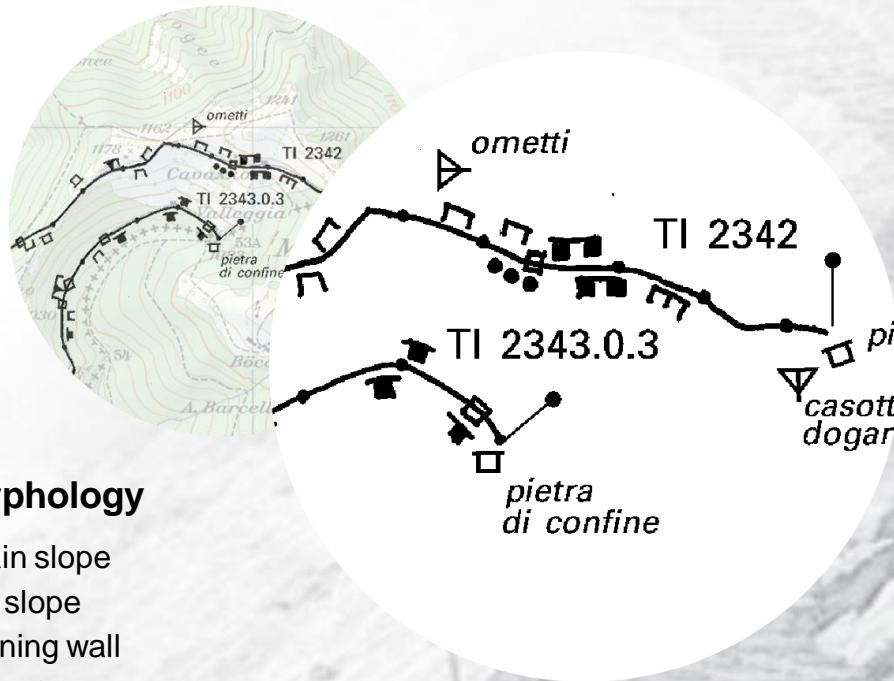
- location, notes and metadata of Elements found along the way:
  - Left side; - Right side; - In front

- Resulting in digital data following a data model

New data model

- Register your track and along it:
  - Register elements start & end points
  - Register characteristics (type, width, height, etc.)
  - Add multimedia notes (audio, video, text)

- Send to the server
  to store

- Elaborate data using
  "linear referencing"
  for display

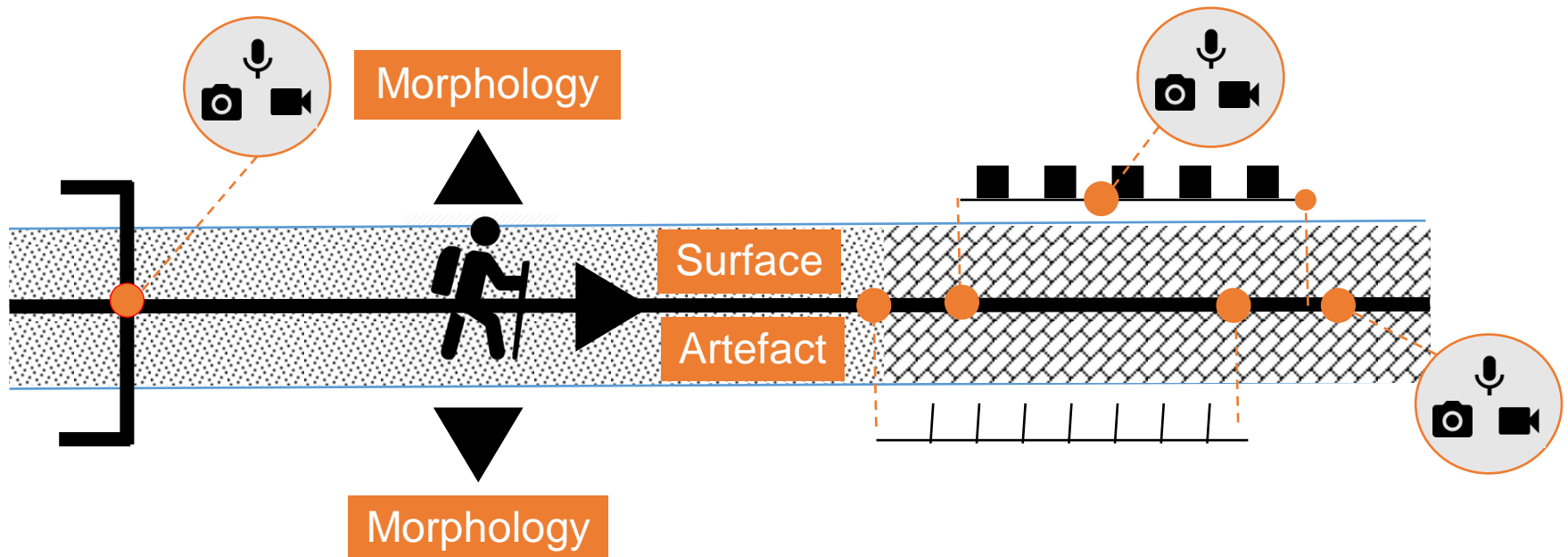| Key	Value
▼ (1) ObjectId("53d61fdb3fb6ed2ac08c5011")	{ 14 fields }
_id	ObjectId("53d61fdb3fb6ed2ac08c5011")
▶ characteristics	{ 7 fields }
name	vf:1
▼ rightside	Array [1]
▼ 0	{ 8 fields }
height	7.350000
▶ startPoint	{ 5 fields }
width	2.350000
type	www.camre.ch/properties/scarp/terrain/down
_id	ObjectId("53d61fdb3fb6ed2ac08c4ff9")
▶ notes	Array [1]
▶ endPoint	{ 5 fields }
status	www.camre.ch/properties/surface/status/good
▼ leftside	Array [2]
▶ 0	{ 8 fields }
▶ 1	{ 8 fields }
▼ surface	Array [1]
▶ 0	{ 7 fields }
status	www.camre.ch/status/pending
▶ author	{ 3 fields }
▶ geometry	{ 3 fields }
▶ contributors	Array [0]
path	via del ferro
▶ bridge	Array [1]
timestamp	2014-07-28 10:03:07.580Z
▶ techinfo	{ 6 fields }
▶ (2) ObjectId("53d61ffd3fb6ed2ac08c5039")	{ 14 fields }

I CAMMINI DELLA REGINA
percorsi transfrontalieri legati alla Via Regina

Path initialization

Survey
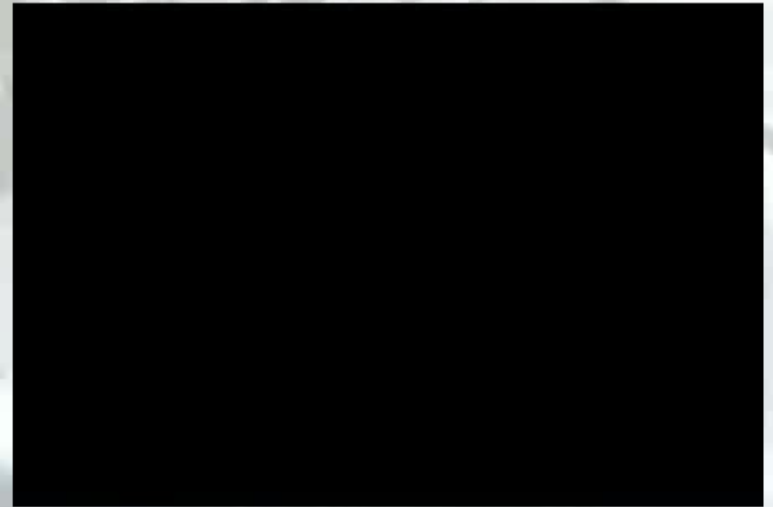
Overview of survey

TransguardiWeb

- Emotional and immersive solution that, associating places (geo-information) with the technique of storytelling (narrative) and multimedia (images, video, audio and photosphere), promote the understanding of the territory trough the dissemination of its history, culture and landscape.
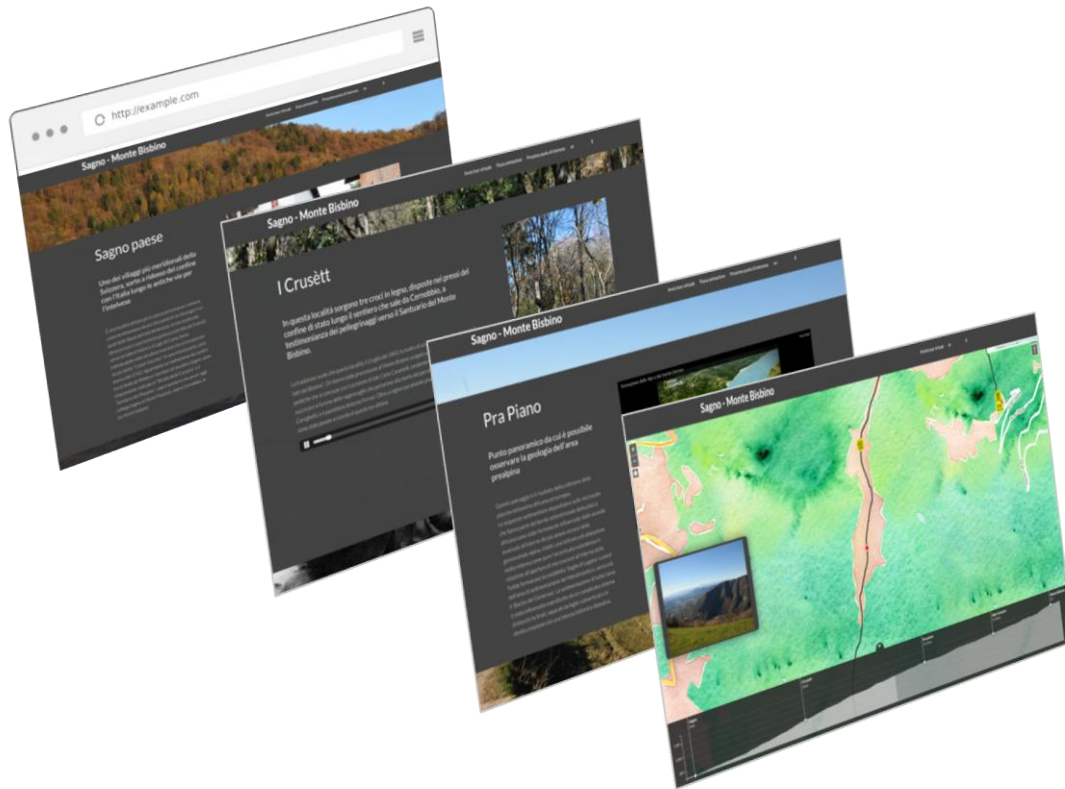
FOSS Technologies

- OpenLayers

- Bootstrap

- JQuery

- D3.js

- Less.js

- GeoJSON

- OpenLayers3

- Pano

I CAMMINI DELLA REGINA
percorsi transfrontalieri legati alla Via Regina

Geographically referenced multimedia builder

POI specific representation

JSON with POIs

3D path

```
{
    "type":"Feature",
    "geometry":{
        "type":"Point",
        "coordinates":[
            9.038951437350024,
            45.85650068640169
        ],
        "crs":{
            "type":"name",
            "properties":{
                "name":"EPSG:4326"
            }
        }
    },
    "properties":{
        "id":1,
        "name":"Sagno",
        "type":"Storico",
        "legend":true,
        "profile":true,
        "time":"0min"
    }
}
```
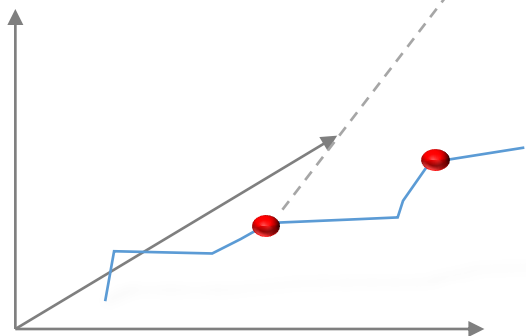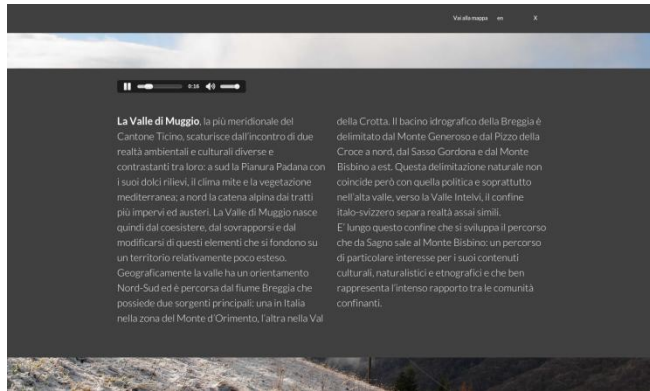
```
{
    "main":[
        {
            "type":"cd-fixed-bg",
            "backgroundImage":"resources/sagno/images/cavazzo/image1.jpg"
        },
        {
            "type":"cd-scrolling-bg",
            "styleClass":"cd-color-2",
            "content":{
                "text":{
                    "position":"left",
                    "title":"Alpe Cavazzo",
                    "description":"In una interessante carta storica del 1762, rig
                    "text":"Il sentiero che sale alla località Cavazzo e quindi a
                    "column":"number of column"
                },
                "multimedia":{
                    "type":"image",
                    "link":"resources/sagno/images/cavazzo/image2.jpg",
                    "orientation":"v"
                },
                "audio":[
                    {
                        "url":"resources/sagno/audio/en/part2.ogg",
                        "type":"audio/ogg"
                    },
                    {
                        "url":"resources/sagno/audio/en/part2.mp3",
                        "type":"audio/mpeg"
                    }
                ]
            }
        },
        {
            "type":"cd-fixed-bg",
            "backgroundImage":""
        }
    ]
}
```
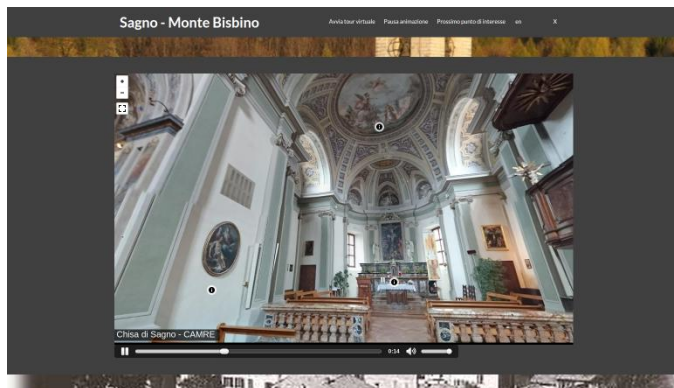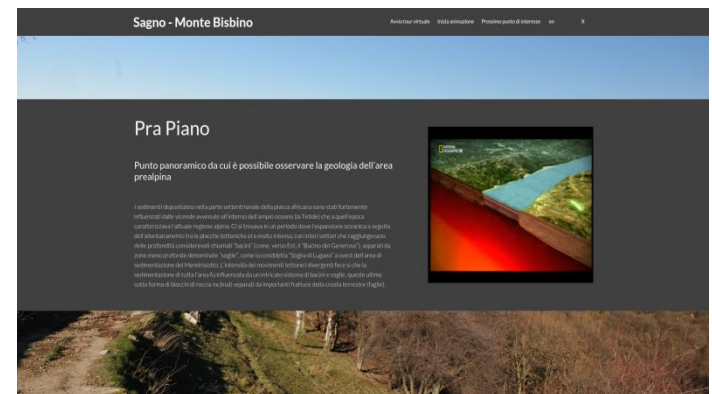
I CAMMINI DELLA REGINA
percorsi transfrontalieri legati alla Via Regina

Virtual Tour

Audio

Dynamic map

Demo

Photo sphere

Video

Sagno – Monte Bisbino
Dalla religiosità all'illegalità

Thank you