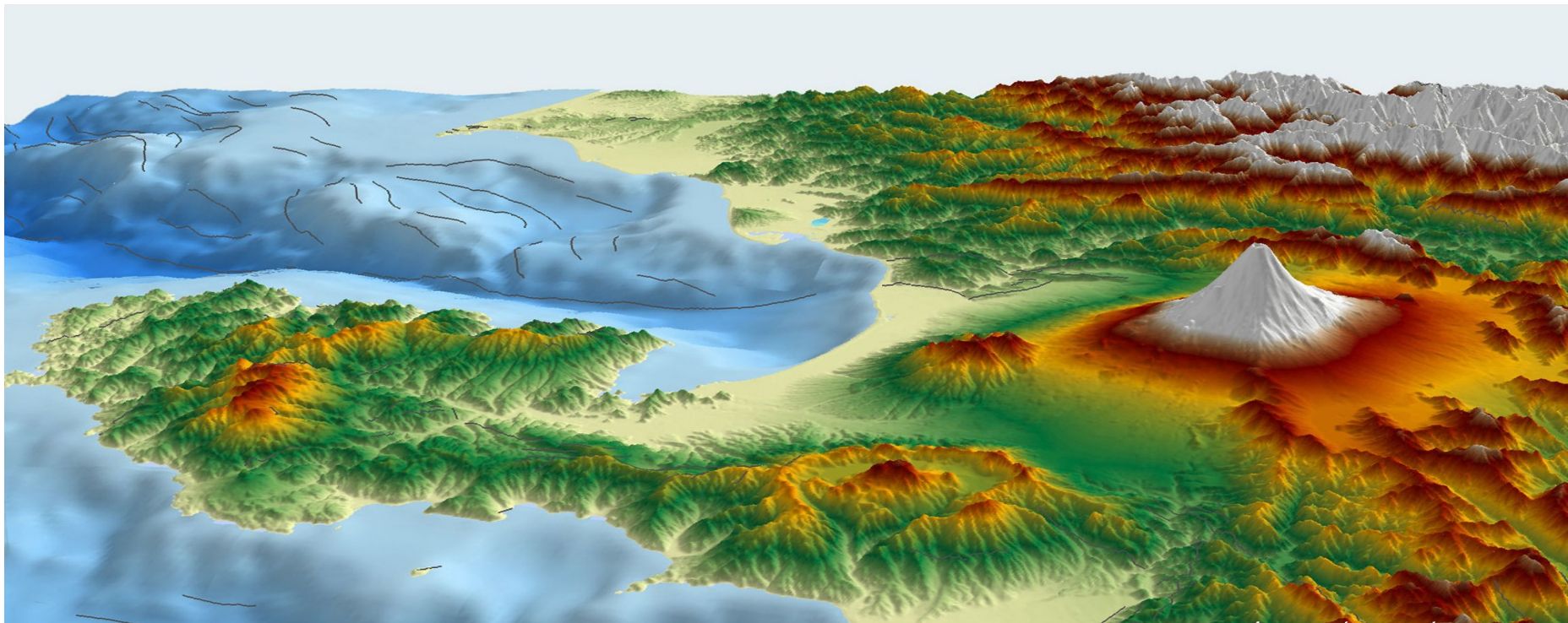# Una app per Via Regina: tutti possono mappare!

Maria Antonia Brovelli, Alba Lucchese, Marco Minghini, Marco Negretti, Giorgio Zamboni

Politecnico di Milano, Dipartimento di ingegneria Civile e Ambientale (DICA) – Laboratorio di Geomatica, Polo Territoriale di Como

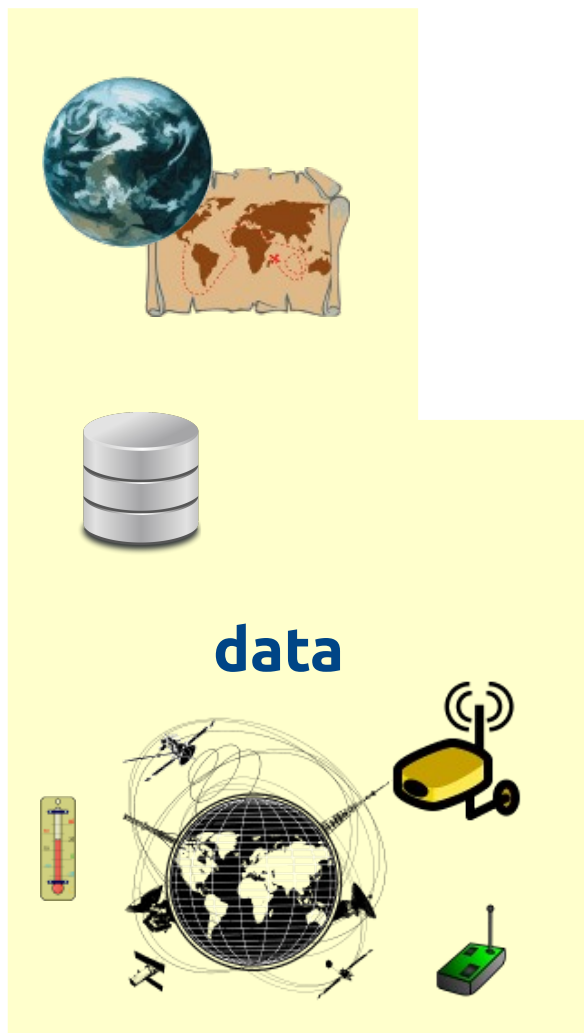# Geographic Information Systems (GIS)

❖ The set of software, hardware, people, institutions and standards, which together deal with acquiring, storing, manipulating, analyzing, managing and presenting all types of geographic data.
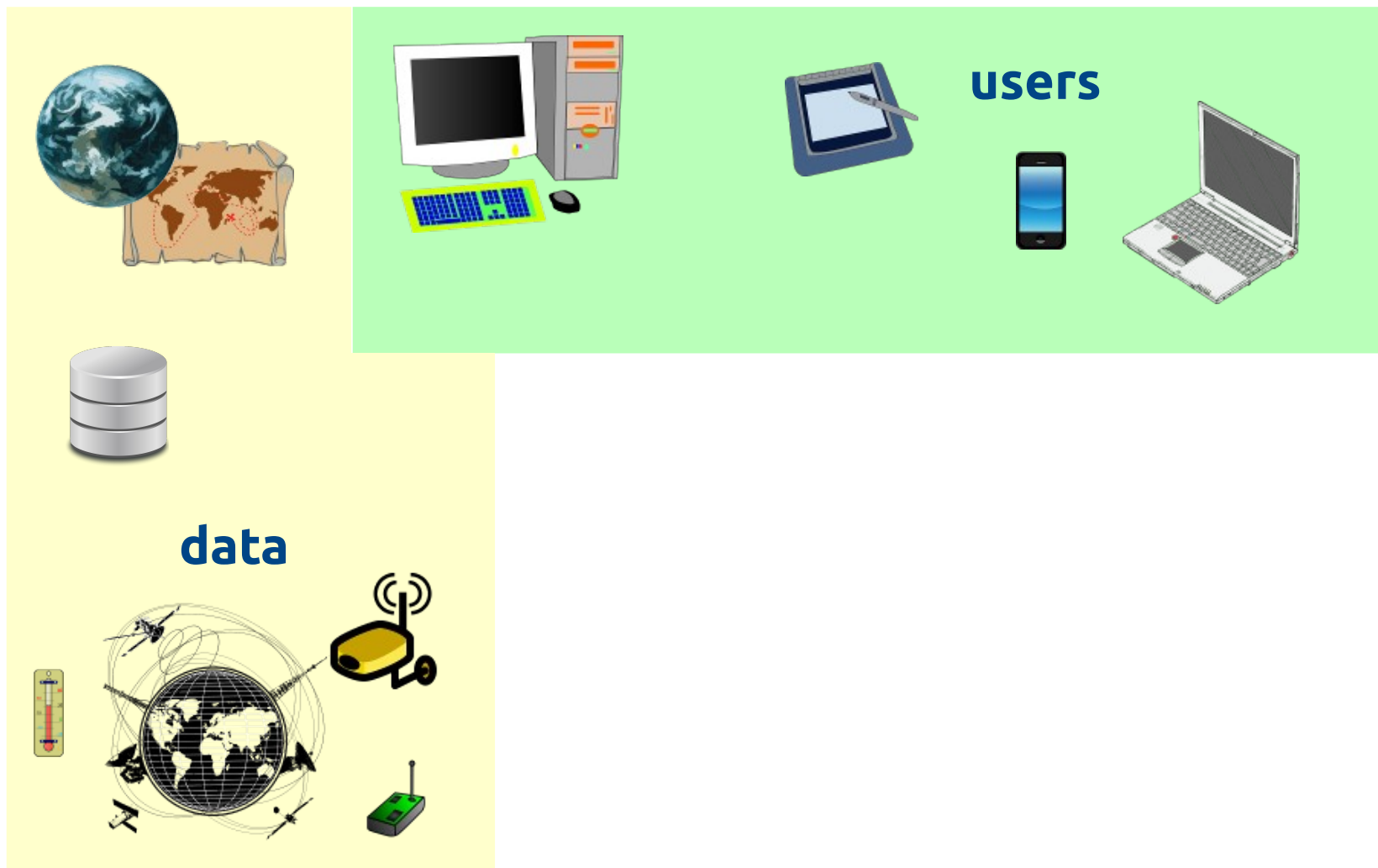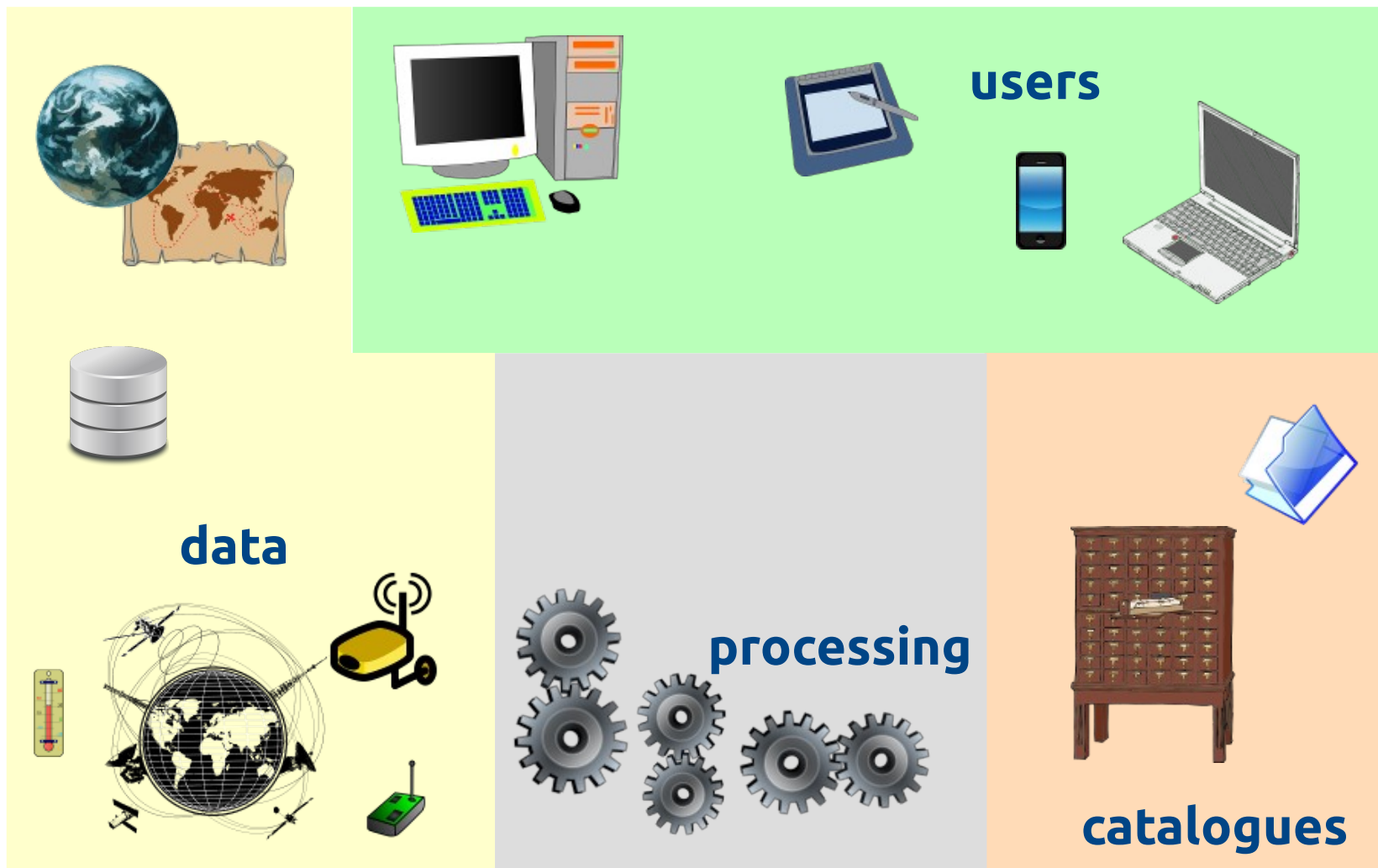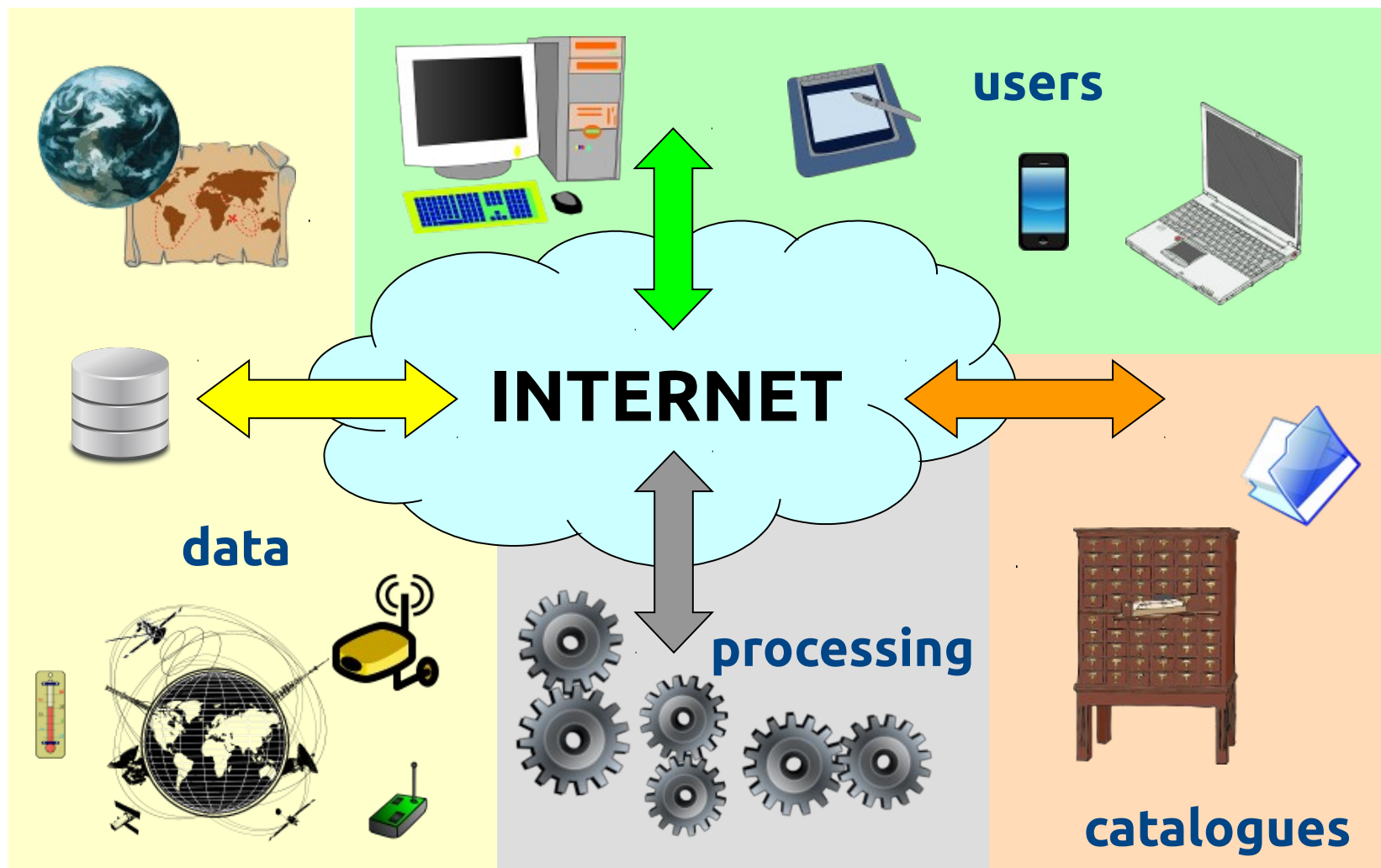
Geospatial Web

Geospatial Web

data

Geospatial Web

users

data

Geospatial Web

users

data

catalogues

Geospatial Web

users

data

processing

catalogues

Geospatial Web

users

INTERNET

data

processing

catalogues

GeoWeb 2.0

❖ Evolution of the 1990s GeoWeb 1.0

❖ Interactive tools allowing user participation in spatial data management

❖ OGC standards for geospatial interoperability

❖ GPS, AJAX and mapping Application Programming Interfaces (APIs)

❖ Neogeography (Turner 2006)

  ➢ creation of maps through mash-ups of multiple data sources

❖ Volunteered Geographic Information (VGI) (Goodchild 2007)

  ➢ the idea of humans behaving like sensors able to acquire geospatial contents

❖ Crowdsourcing (Howe 2006)

  ➢ the act of a mass of users to share a job through an open call

❖ Diffusion of mobile devices equipped with sensors (GPS, camera, etc.)

  ➢ users can easily perform real-time collection of georeferenced data

Citizen science

❖ Set of practices in which citizens participate in data collection, analysis and dissemination of a scientific project

❖ Active or passive

❖ Explicit or implicit

❖ Classification

➤ 'classic' citizen science: amateurs engaged in traditional scientific activities

➤ community science: measurements and analysis carried out by amateurs in order to set action plans to deal with environmental problems

➤ citizen cyberscience: use of computers, GPS receivers and mobile phones

✗ volunteered computing: citizens download data, run analyses on their own computers and send back data to the server

✗ volunteered thinking: citizens perform classification works

✗ participatory sensing: applications centered on mobile phones capabilities

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Web Mapping within the Via Regina project

- ❖ Crucial for disseminating knowledge and increasing tourism
- ❖ Responsible partners:
  - ➢ Politecnico di Milano – Polo Territoriale di Como (project leader)
  - ➢ Scuola Universitaria Professionale della Svizzera Italiana (SUPSI)

- ❖ Planned activities & deliverables:
  - ➢ implementation of standard geoWeb services for data dissemination
  - ➢ creation of a Web platform for remote data upload and sharing
  - ➢ development of an application for data input from mobile devices
  - ➢ implementation of multi-dimensional viewers (2D & 3D)
  - ➢ design of an Augmented Reality application

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- ❖ Exploitation of Free and Open Source Software (FOSS)

Mobile data collection

❖ Allows everyone to report interesting elements in the Via Regina area

- ➤ historical and cultural elements
- ➤ morphological elements
- ➤ tourist elements
- ➤ critical elements
- ➤ warnings

Mobile data collection

❖ Historical and cultural element

➢ 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)

Mobile data collection

❖ Historical and cultural element

➢ Archaeological element
  - ✗ archaeological element
  - ✗ archaeological site
  - ✗ element inside a building
  - ✗ single element

➢ Military building
  - ✗ castle
  - ✗ tower
  - ✗ defensive wall
  - ✗ fort
  - ✗ trench
  - ✗ redoubt (secondary fort)
  - ✗ bunker

➢ Factory
  - ✗ furnace
  - ✗ trip hammer
  - ✗ mill
  - ✗ sawmill
  - ✗ quarry
  - ✗ mine
  - ✗ rural factory

Mobile data collection

❖ Morphological element

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

➢ Bounding escarpment
- ✗ rock
- ✗ ground escarpments
- ✗ rock escarpments
- ✗ support walls
- ✗ boundary walls and railings
- ✗ tree-lined avenues

- ✗ fence/barrier
- ✗ vertical plate

➢ Traffic support and manufactured product
- ✗ kilometric stone
- ✗ border stone
- ✗ stone marker
- ✗ isolated tree
- ✗ inscription
- ✗ fountain
- ✗ ancient laundry
- ✗ bridge
- ✗ rest of bridge
- ✗ tomb
- ✗ underpass
- ✗ tunnel
- ✗ panoramic viewpoint

Mobile data collection

❖ Tourist element

➤ Accommodation and overnight stay
  ✗ hotel
  ✗ hostel
  ✗ B&B
  ✗ hut/shelter
  ✗ camping
  ✗ private accommodation
  ✗ free accommodation
  ✗ agritourism
  ✗ apartment

➤ Transport
  ✗ bus stop
  ✗ dock/ferry
  ✗ train station
  ✗ funicular and ski lift

➤ Services
  ✗ pharmacy
  ✗ parking
  ✗ school
  ✗ public safety
  ✗ spring
  ✗ city hall
  ✗ post office
  ✗ wc
  ✗ bank
  ✗ park area
  ✗ ATM
  ✗ info point
  ✗ wifi hotspot

Mobile data collection

❖ Tourist element

➢ Services
  ✗ bike sharing
  ✗ electric car charging point
  ✗ hospitals/emergency room
  ✗ hiking signs

➢ Food services
  ✗ bus stop
  ✗ dock/ferry

➢ Products
  ✗ wine shop
  ✗ craft
  ✗ food/typical products
  ✗ clothing shop

Mobile data collection

❖ Critical element

  ➢ Morphological

    ✗ ford
    ✗ landslide

  ➢ Structural

    ✗ crossing with traffic light
    ✗ crossing without crossing stripes
    ✗ crossing with crossing stripes

❖ Warning

  ➢ [whatever kind of warning the user specifies]

Mobile data collection

❖ Based on the suite of tools OPEN DATA KIT

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

FORM CREATION

BUILD

XLSForm

FORM COMPILATION

Apache Tomcat™

AGGREGATE

FORM STORAGE

COLLECT

ANDROID

ENKĒTO SMART PAPER
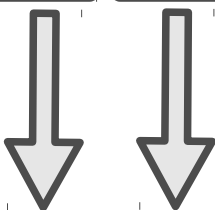
Mobile data collection

❖ Download of the Android app

COLLECT

➤ open the Google Play store

➤ look for the ODK Collect app

➤ download the app

Mobile data collection
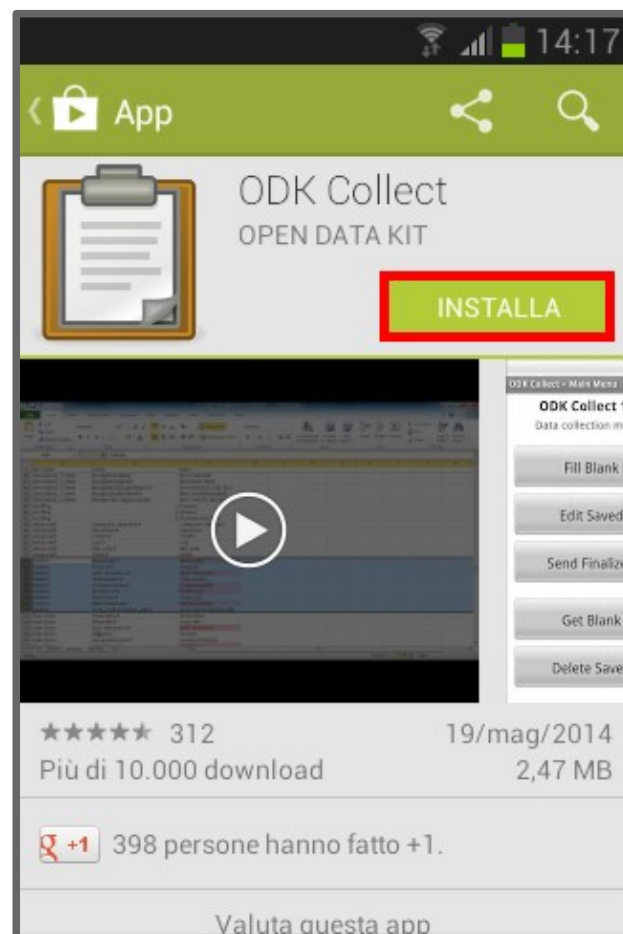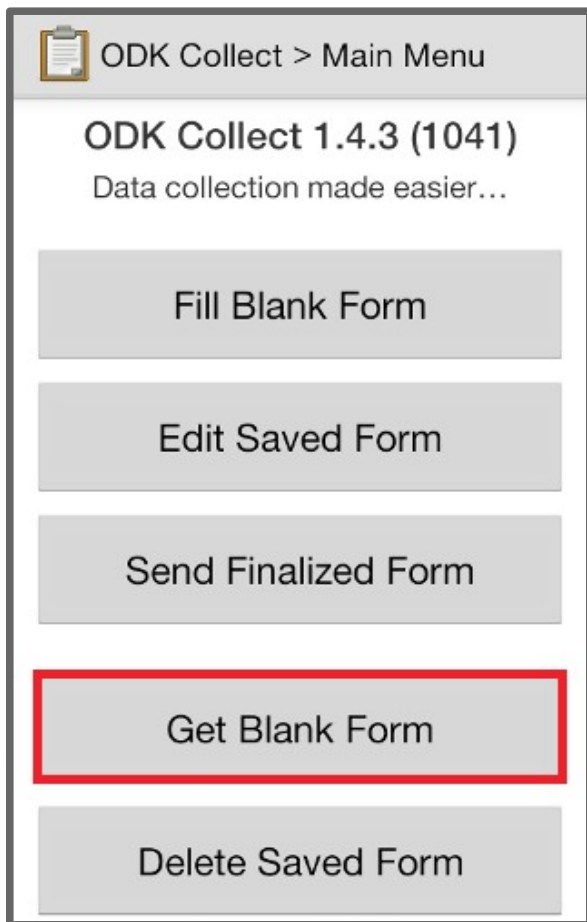
❖ Configuration of the Android app

COLLECT
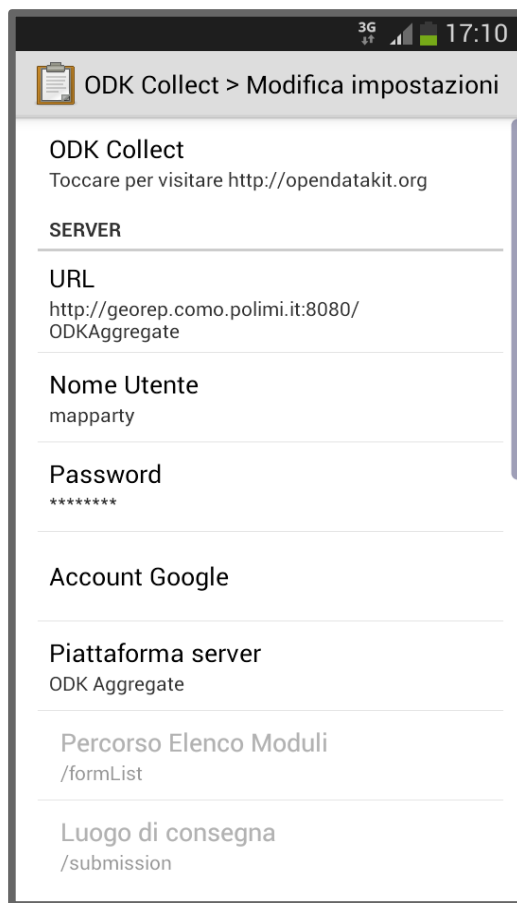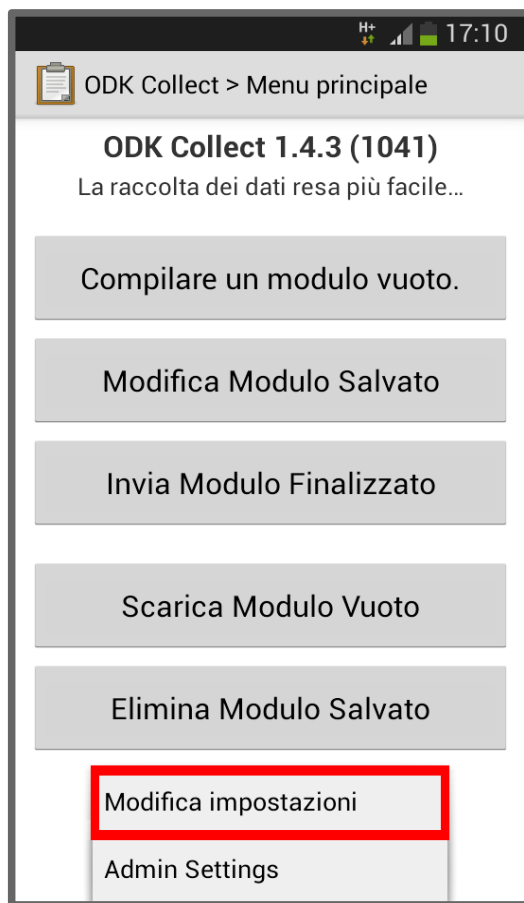
> URL: http://georep.como.polimi.it:8080/ODKAggregate
> Username: mapparty
> Password: mapparty

Mobile data collection

❖ Form download

Mobile data collection

❖ Form compilation

ODK Collect > Main Menu

ODK Collect 1.4.3 (1041)

Data collection made easier…
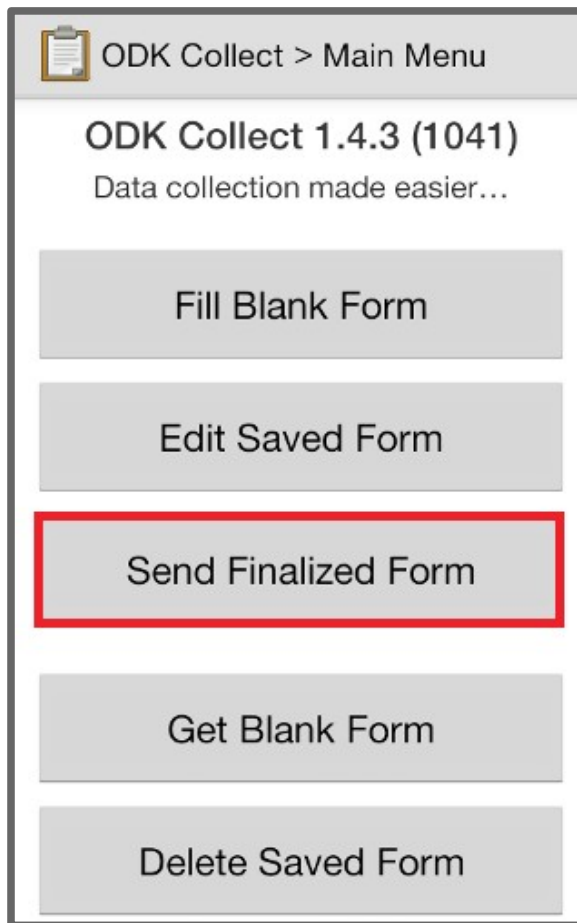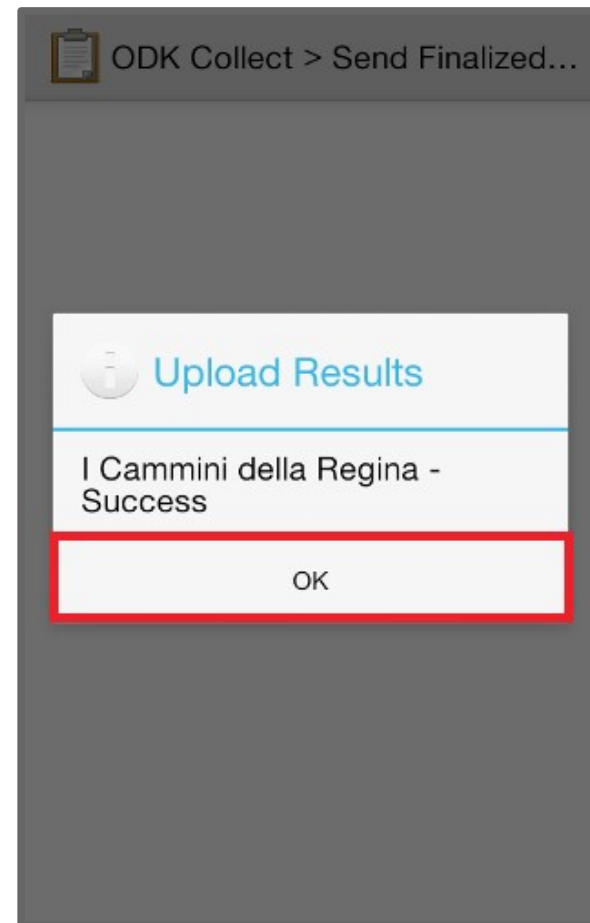
Fill Blank Form

Edit Saved Form

Send Finalized Form

Get Blank Form

Delete Saved Form

ODK Collect > Fill Blank Form

Finished scanning. All forms loaded.

Architectural Barriers
Added on Fri, Mar 07, 2014 at 10:25

Arredo_urbano
Added on Wed, Mar 05, 2014 at 13:14

I Cammini della Regina
Added on Sun, Apr 06, 2014 at 16:13

Point Of Interest
Added on mer, gen 22, 2014 at 16:29

sample
Added on Thu, Apr 03, 2014 at 15:33

ODK Collect…

I CAMMINI DELLA REGINA
percorsi transfrontalieri legati alla Via Regina

You are at the start of I Cammini della Regina. Swipe the screen as shown below to go backward and forward.

backward to previous prompt

forward to next prompt

Mobile data collection

❖ Form compilation

Mobile data collection

❖ Form compilation

Mobile data collection

❖ Form compilation

Position of the element:

Be sure to be outdoors and check that the device GPS is on. Alternatively, you can also determine the position by connecting to a wi-fi network.

Replace Location

Latitude: N 45°50'16"
Longitude: E 9°4'39"
Altitude: 0m
Accuracy: 5.5m
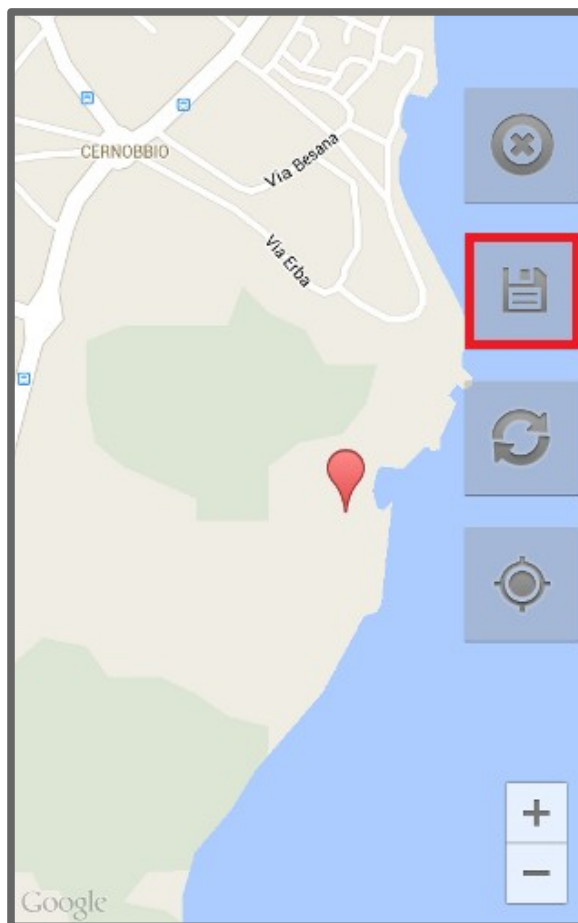
Picture showing the element:

Take a picture of the element using the device camera or upload a picture available on the device.

Take Picture

Choose Image

Mobile data collection

❖ Form compilation & saving

Mobile data collection

❖ Form editing & sending

Mobile data collection

❖ Form compilation from PC: https://5urmg.enketo.org/webform

➢ Chrome Web browser needed!

Web viewer architecture

Apache Tomcat

GeoServer

PostgreSQL

PostGIS
Spatial PostgreSQL

Apache Tomcat

ODK AGGREGATE

WMS
WFS

template form

compiled form

OpenLayers™

GeoExt

ExtJS

ENKÉTO SMART PAPER

ODK COLLECT

ANDROID

INTERREG
ITALIA~SVIZZERA ITALIE~SUISSE ITALIEN~SCHWEIZ

ti u

Regione
Lombardia

POLITECNICO
DI MILANO

I CAMMINI DELLA REGINA
percorsi transfrontalieri legati alla Via Regina
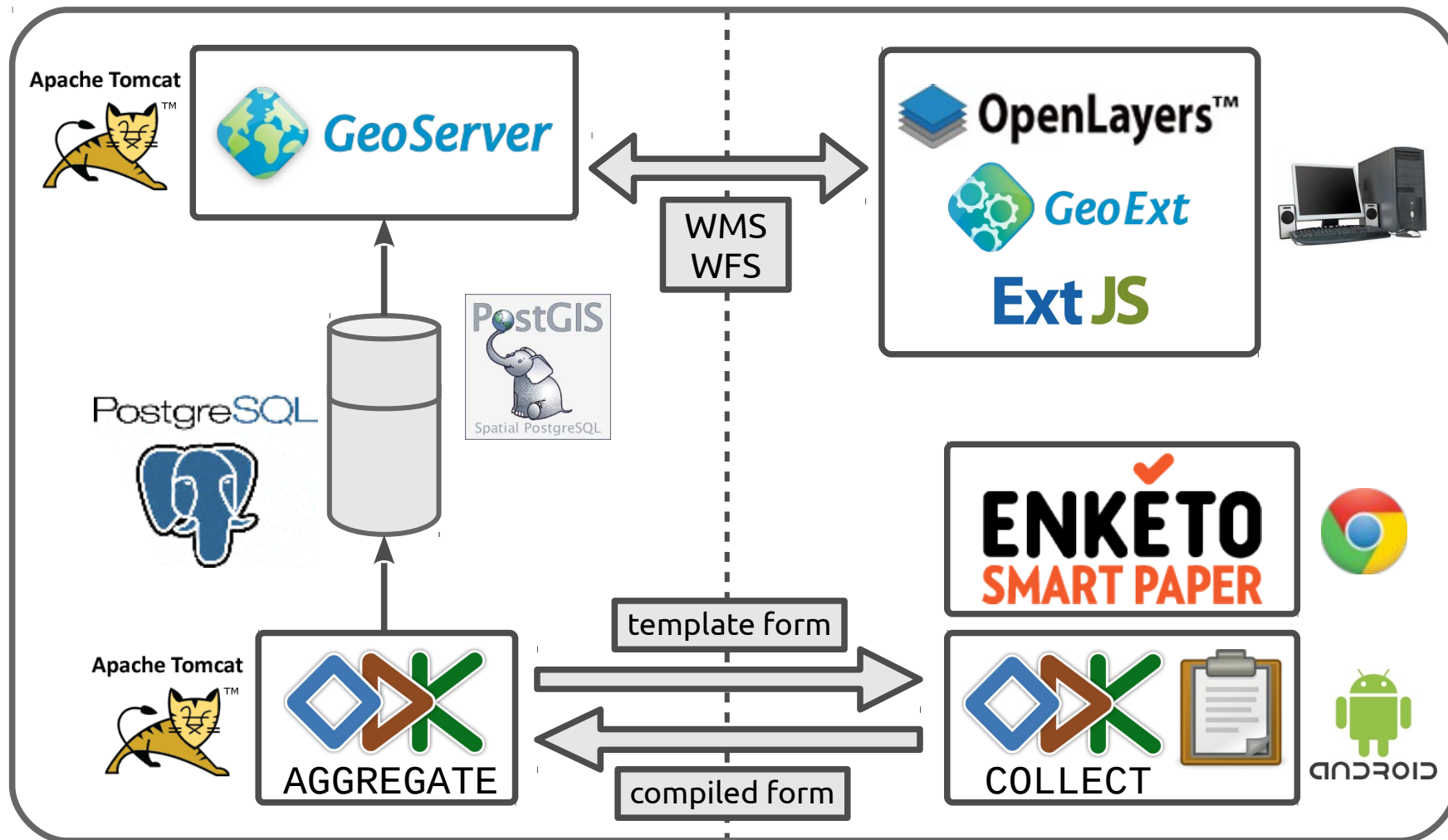
Via Regina 1st map party

SABATO 3 MAGGIO 2014

MapParty!

CAMMINARE, OSSERVARE, DISEGNARE, MAPPARE
LUNGO I CAMMINI DELLA REGINA PER UN'ESPERIENZA
CULTURALE, SENSORIALE E GIOCOSA

PIAZZOLA
min 20

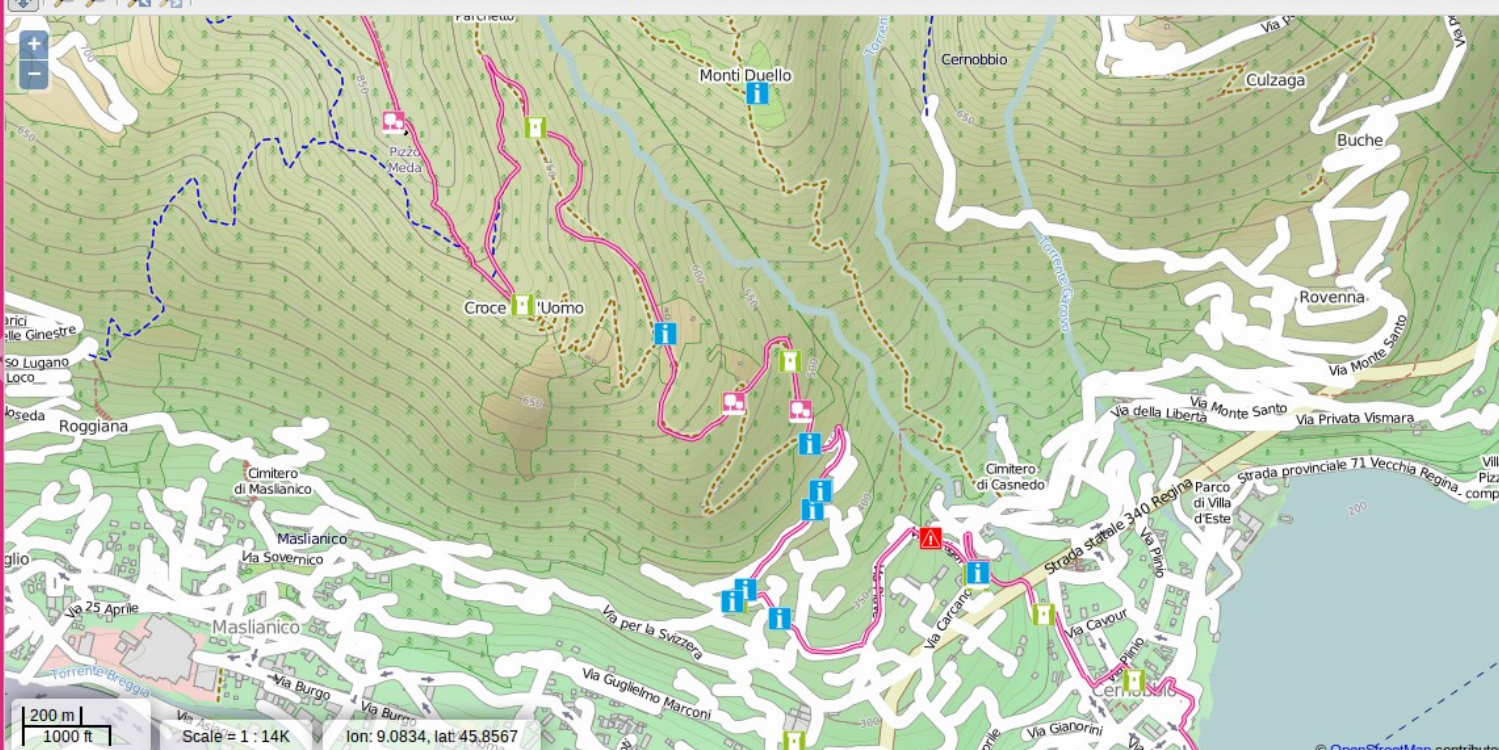SAGN BISBIN   CERNOBI COMM

INTERREG
ITALIA~SVIZZERA ITALIE~SUISSE ITALIEN~SCHWEIZ

ti

Regione Lombardia

POLITECNICO DI MILANO

I CAMMINI DELLA REGINA
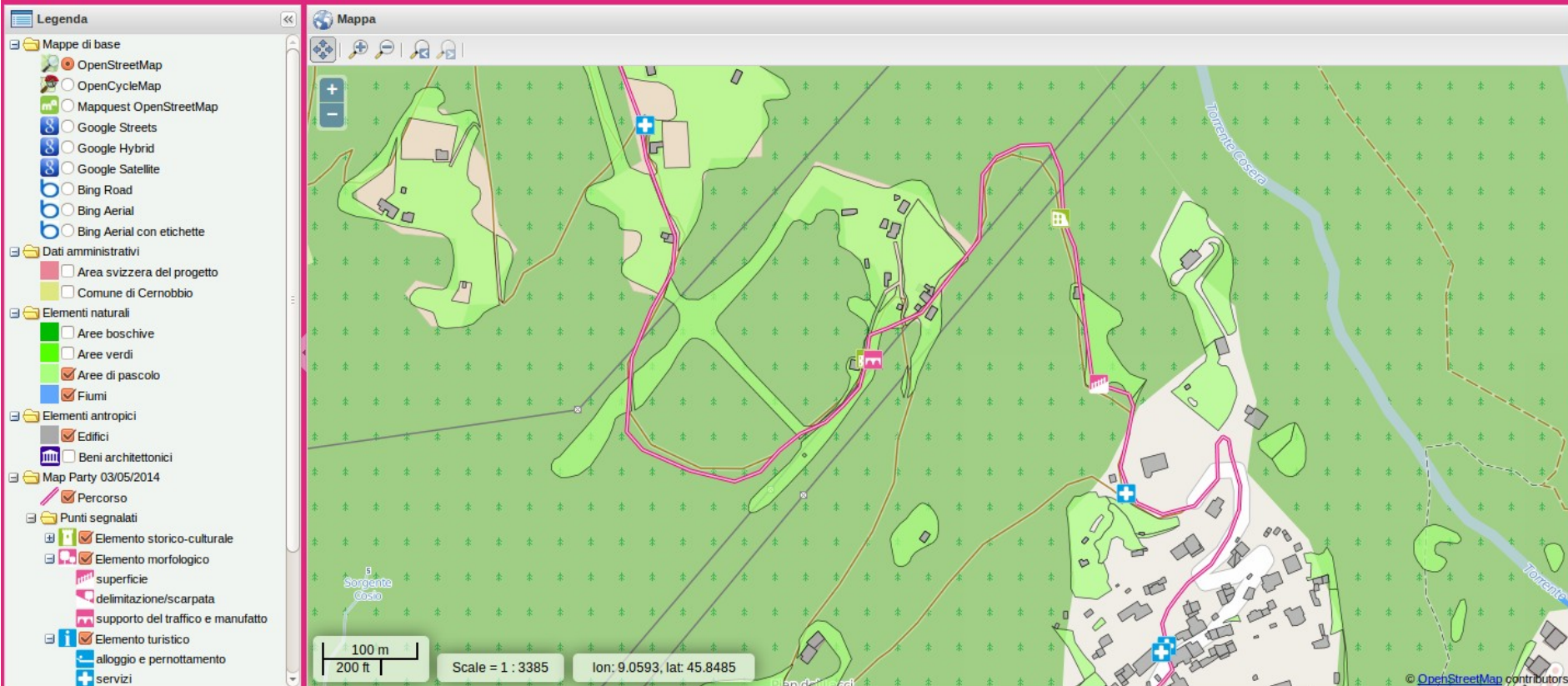percorsi transfrontalieri legati alla Via Regina

Via Regina 1ˢᵗ map party

Via Regina 1ˢᵗ map party

MapParty! 3 MAGGIO 2014

Legenda

- Mappe di base
  - ● OpenStreetMap
  - ○ OpenCycleMap
  - ○ Mapquest OpenStreetMap
  - ○ Google Streets
  - ○ Google Hybrid
  - ○ Google Satellite
  - ○ Bing Road
  - ○ Bing Aerial
  - ○ Bing Aerial con etichette
- Dati amministrativi
  - ☐ Area svizzera del progetto
  - ☐ Comune di Cernobbio
- Elementi naturali
  - ☐ Aree boschive
  - ☐ Aree verdi
  - ☑ Aree di pascolo
  - ☑ Fiumi
- Elementi antropici
  - ☑ Edifici
  - ☐ Beni architettonici
- Map Party 03/05/2014
  - ☑ Percorso
  - Punti segnalati
    - ☑ Elemento storico-culturale
    - ☑ Elemento morfologico
      - superficie
      - delimitazione/scarpata
      - supporto del traffico e manufatto
    - ☑ Elemento turistico
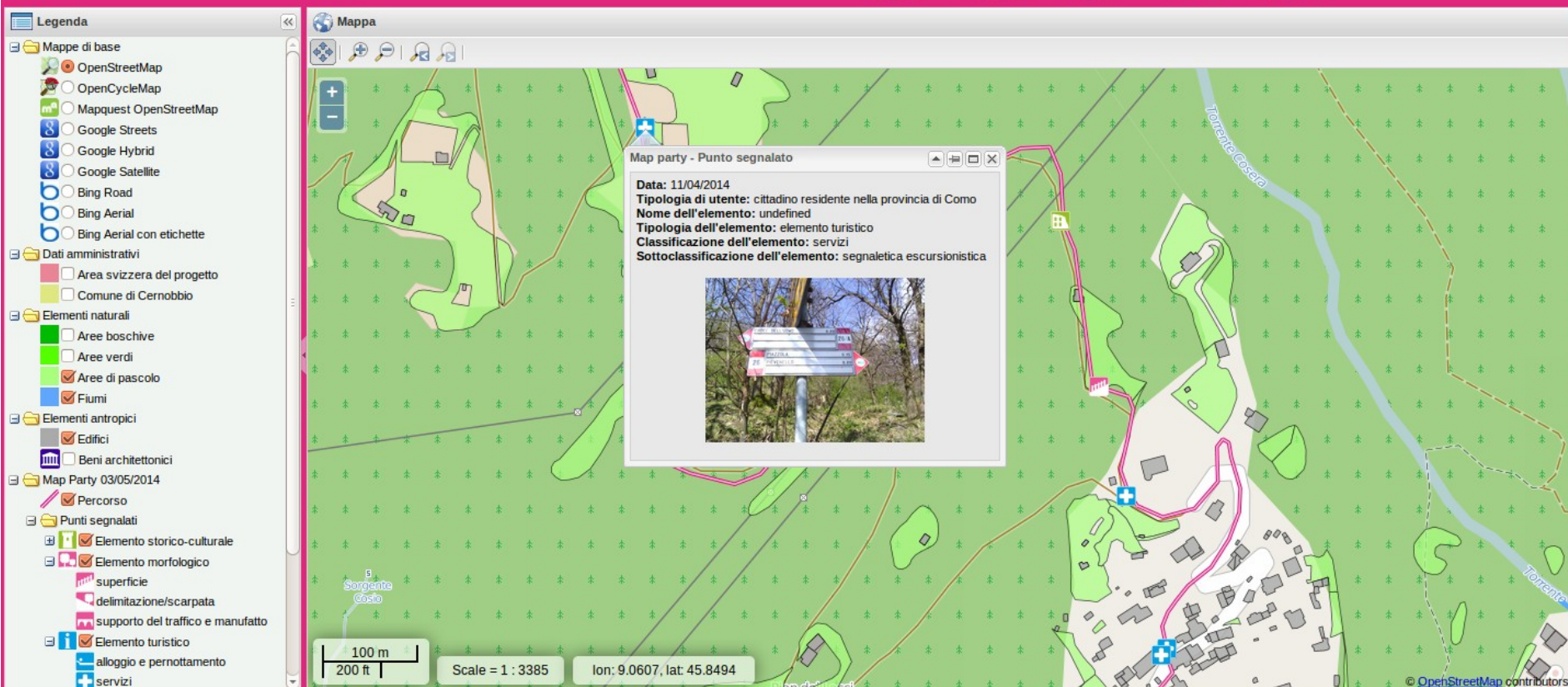   - alloggio e pernottamento
      - servizi

Mappa

Scale = 1 : 3385   lon: 9.0593, lat: 45.8485

100 m
200 ft

© OpenStreetMap contributors

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

Via Regina 1ˢᵗ map party

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

Acknowledgments

❖ This research has been funded by the INTERREG "I Cammini della Regina – Percorsi transfrontalieri legati alla Via Regina (The paths of Regina – Crossborder paths departing from Via Regina)" 2007-2013 project.

http://www.viaregina.eu

https://www.facebook.com/viaregina2.0

Thanks for your attention!

Marco Minghini

Politecnico di Milano
Laboratorio di Geomatica – Polo Territoriale di Como
Via Valleggio 11, 22100 Como (Italy)

marco.minghini@polimi.it