Tiers

Workflow

Technological component

Visualization tier
The top-most level of the geospatial cyberinfrastructure. The dashboard design includes graphical tools, procedures to combine spatial data (analysis and visualization), and the production of tables, charts and maps.
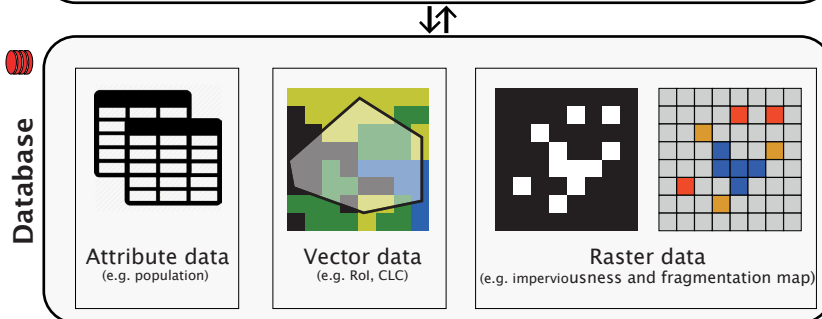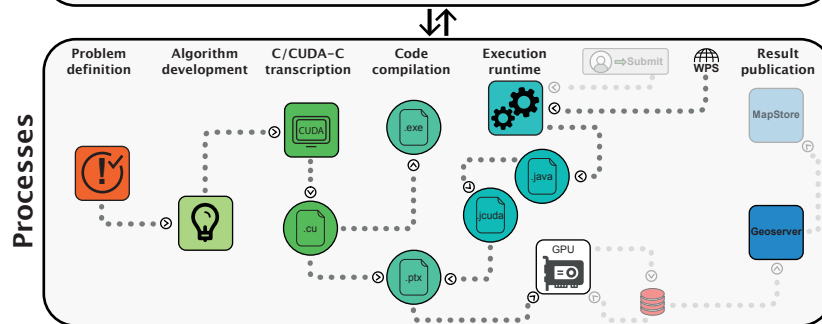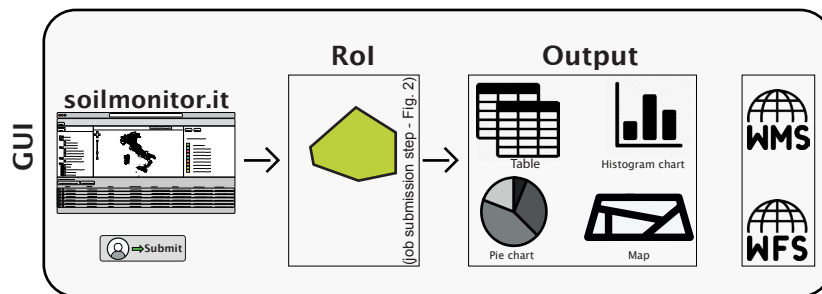
GUI

soilmonitor.it

⇒Submit

RoI

(job submission step - Fig. 2)

Output

Table

Histogram chart

Pie chart

Map

WMS

WFS

MapStore

GeoExt

Highcharts

Logic tier
This layer orchestrates the Soil Monitor application, processes commands, makes logical decisions and performs calculations, including those based on the CUDA framework. It also moves data between the two adjacents layers.

Processes

Problem definition

Algorithm development

C/CUDA-C transcription

Code compilation

Execution runtime

⇒Submit

WPS

Result publication

CUDA

.exe

.cu

.ptx

.java

.jcuda

GPU

MapStore

Geoserver

GeoServer

GDAL

NVIDIA CUDA

C Programming

Data tier
Here information is stored and retrieved from both the database or the file system. The information is passed back to the logic tier for processing and to the user for visualization purpose.

Database

Attribute data
(e.g. population)

Vector data
(e.g. RoI, CLC)

Raster data
(e.g. imperviousness and fragmentation map)

PostGIS

PostgreSQL

File system