Open Land Use

Software Requirements Specification

for the *data component*

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SPECIFIC REQUIREMENTS

This chapter summarizes concrete requirement specifications in the following table and further provides related discussion.

Requirement identifier	*Sub-requirement identifier*	*Requirement scope*	*Requirement*	*Provider*	*Priority*	*Status*
RQ1		Business and policy requirements	OLU should dispose of capabilities to be contributed by users and enhanced by Volunteering Geographic Information (VGI).	SDI4Apps	should have	rejected
RQ2		Business and policy requirements	All the software tools OLU data component runs on and is being developed by shall be under licensing conditions that enable OLU development team to use them for both non-commercial and commercial purposes.	OLU	must have	incorporated
RQ3		Business and policy requirements	All the datasets used in OLU shall be under licensing conditions that enable being downloaded and used for both non-commercial and commercial purposes.	OLU	must have	incorporated
RQ4		Business and policy requirements	OLU should provide two levels of data processing downloadable by the user, according to the business model of the system.	OLU	could have	proposed
	RQ4.1	Data processing requirements	The data provided by the free level of data processing will be the main OLU dataset with other thematic layers as attributes aggregated for each Open Land Use object.	OLU	could have	proposed
	RQ4.2	Data processing requirements	The data provided by the paid level of data processing will be the main OLU dataset along with other thematic layers, spatially intersected by the Open Land Use objects.	OLU	could have	proposed
RQ5		Business and policy requirements	OLU may extend its data coverage beyond the borders of the European Union and Europe.	Plan4All	won't have	approved
RQ6		Business and policy requirements	All new software and hardware interfaces or processing functions should be built on the infrastructure that was already deployed before the creation of this document.	OLU	must have	proposed
RQ7		Data processing requirements	The data component should not change to such extent it would not be connectable to the already deployed user interfaces: Web Map Service, Web Feature Service, download from Open Land Use webpages.	OLU	must have	proposed
RQ8		Data processing requirements	Data processing of newly deployed OLU features can exceed computational resources of the already deployed hardware interfaces by maximum of 50 %	OLU	must have	approved
RQ9		Data processing requirements	There shall be a uniformed land-use/land-cover classification system in OLU.	SDI4Apps	must have	incorporated

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RQ10		Data processing requirements	OLU data shall be uniformed under a single coordinate reference system.	OLU	must have	incorporated
RQ11		Data processing requirements	OLU must dispose of processing functions to inspect the dataset metadata and process them to be storable in the database	OLU	must have	approved
RQ12		Data processing requirements	OLU shall alter its compilation process to account additional thematic layers.	EUXDAT/OLU	must have	approved
	RQ12.1	Data processing requirements	OLU basemap shall be compiled exhaustively to ensure its seamless character	OLU	must have	incorporated
	RQ12.2	Data processing requirements	OLU basemap and any newly created thematic layer shall be constituted by the most geometrically precise datasets available in the area at the time.	OLU	should have	partly incorporated
RQ14		Data processing requirements	OLU shall incorporate a new data model	Plan4All	must have	approved
	RQ14.1	Data processing requirements	OLU basemap shall be made up of OLU objects	OLU	must have	incorporated
	RQ14.2	Data processing requirements	OLU objects shall act as control geometries for additional thematic layers	OLU	must have	approved
	RQ14.3	Data processing requirements	The new OLU data model shall enable dynamic linking to administrative units	OLU	should have	approved
	RQ14.4	Data processing requirements	The new OLU data model shall enable to conduct all data processing operations within the database	OLU	should have	approved
	RQ14.5	Dataset requirements	OLU shall enable to scale data download up to the administrative unit level of NUTS5.	OLU	should have	approved
RQ15		Data processing requirements	OLU shall ensure regular automatic updates of the contributing datasets.	OLU	should have	proposed
RQ16		Data processing requirements	The main OLU dataset shall be a vector layer.	OLU	should have	incorporated
RQ17		Data processing requirements	OLU data shall be downloadable at least in the ESRI shapefile format.	OLU	must have	incorporated
RQ18		Data processing requirements	OLU should implement a mechanism to observe LULC changes	Plan4All	won't have	proposed

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RQ19		Data processing requirements	OLU shall explicitly specify dataset quality and precision characteristics for each OLU element.	OLU	won't have	proposed
RQ20		Dataset requirements	OLU should enable downloading older or historical data.	EUXDAT	won't have	proposed
RQ21		Dataset requirements	OLU shall incorporate additional thematic layers	EUXDAT	must have	approved
	RQ21.1	Dataset requirements	OLU should offer a layer with the characteristics of spatial attractiveness.	PoliRural	could have	proposed
	RQ21.2	Dataset requirements	OLU should offer a layer with the characteristics of soils and weather.	EUXDAT, SIEUSOIL	could have	proposed
	RQ21.3	Dataset requirements	OLU should offer a seamless layer with the hydrological network and water bodies.	EUXDAT	could have	proposed
	RQ21.4	Dataset requirements	OLU should offer a digital elevation model layer.	EUXDAT	could have	proposed
	RQ21.5	Dataset requirements	OLU should offer a layer with field borders.	EUXDAT	could have	approved
RQ22		Dataset requirements	OLU should be extended with earth observation data.	EUXDAT	could have	approved

Business and policy requirements

One of the primary targets of OLU, proposed by its parent project SDI4Apps, was that OLU would be created largely by public contributions of users (*RQ1*). However, such VGI capacity has never been realized, and therefore it was assumed this requirement was rejected. As mentioned in *Section 2.3* of this SRS, OLU is going to offer the data to the wide public with eligible business applications. It means that although requirements *RQ2* and *RQ3* are now fulfilled throughout the data component, they are critical and will have to be held on in the future to avoid legal issues. Stemming from the requirement *RQ4* (and sub-requirements *RQ4.1* and *RQ4.2*), OLU will provide a free and a paid level of data processing, whose fundamental difference lies in how additional thematic spatial datasets are delivered along with the OLU base map. Plan4All, as the data component maintainer, also proposed OLU could extend its coverage beyond European borders (*RQ5*) but this is seemingly not planned in the near future. *RQ6* controls the issues of maintainability of the current system.

Data processing requirements

There is a number of internal constraints on development when it comes to data processing. The main aim of OLU is to harmonize data, so it must ensure a unified classification system among LULC datasets (*RQ9*) and a single CRS among all contributing datasets (*RQ10*). Both requirements have already been covered by respective functions and exist in the system, but they will likely elicit several functional requirements for customized data pre-processing, depending on a new input dataset. An example is a single dataset that has been obtained as multiple files and they first need to be merged.

The compilation process of OLU has been partly covering the requirement *RQ12*. While *RQ12.1* and partially *RQ12.2* are fulfilled, the proposal of integrating additional thematic layers (*RQ21*) elicited several new requirements to enhance processing and automate it (*RQ11*, *RQ15*) and to create a new data model to support such processing (*RQ14* and its sub-requirements).

The OLU base map is now a vector layer, as required by *RQ16*. That, however, only applies because all the current contributing datasets are vector layers. The data processing has not implemented methods to handle raster datasets for processing simplification, which is why *RQ16.1* was elicited. *RQ17*, specifying a user data format, is out of the scope of the data component, however, format conversion mechanisms had to be implemented in the system. It is also possible that requirements for different data-download formats will emerge in the future.

RQ18 and *RQ19* specify certainly practical features for the data component, however, these will not likely be implemented in the nearest iterations of the OLU data component.

Dataset requirements

Requirements of this group are mostly user-based, demanding various thematic datasets to be integrated into the OLU map (*RQ21* group). *RQ20* is being in progress as of May 2020, however, it is seemingly a complicated feature and probably will not be present in the system any soon. *RQ22* is one of the topics of the thesis this SRS is an Annex of.