

PDAS: Final Report

Spatial Data Infrastructure for Parcel Desirability Analysis in Slovenia

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1. Project Overview

The project was carried out as part of the SDI Services Implementation course at the University of Salzburg (Department of Geoinformatics - Z_GIS), while project planning and documentation were managed within the GI/EO Project Management course.

1.1. General Information

Title	Spatial Data Infrastructure for Parcel Desirability Analysis in Slovenia			
Acronym	SDI-PDAS			
Period	Start:	24.03.2026	End:	30.06.2026
Team	Andjela Bakovic, Noah Bruckbauer, Timotej Gabrijan, Theresa Wein			
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1.2. Literature Review & Background

Making decisions regarding the real estate market can be a difficult task as the prices of parcels or buildings depend on many different factors. Especially the individual desirability of parcels makes it difficult to provide universally applicable information on the real value. This poses challenges for non-experts like private buyers, but also real estate experts often just work with their subjective opinion. Housing is an important part of life what makes this topic also interesting for the broader public (Reed & Pettit, 2019).

The value of property can be defined as a function of location, physical, legal, and economic factors (Wyatt, 1997). Location is one of the most important of these, since prices change a lot depending on where a parcel is (Podor & Nyiri, 2010). GIS with its spatial analysis capabilities enables a understanding of the relationship between various factors regarding the location and the price (Droj, Kwartnik-Pruc, & Droj, 2024). Similar methods have been used in Croatia, where researchers ranked and evaluated parcels using several criteria at once (Kilić Pamuković et al., 2023).

Besides price, other factors can also affect how much a parcel is worth, such as weather, biodiversity, land use, and accessibility. Especially the accessibility has an important impact on the real estate prices and values. This accessibility often includes walking distances, road network, and bus or train connections (Xue et al., 2020). For overview purposes it could be important to have an insight of the value of parcels in a part of the town or for a whole city. As most of the parcel data contains addresses and zip codes it is possible to statistically aggregate data for cities or regions (Clapp & Rodriguez, 1998).

One of the biggest problems in this area of research is finding a way to measure value objectively. Most estimations regarding the value in this field rely on the subjective judgement, often from real-estate experts (Droj, Kwartnik-Pruc, & Droj, 2024). When advising customers these real estate experts rely on various sources. Researchers suggest that clearer, more transparent ways of measuring value could help municipalities, investors, homebuyers, and urban planners, especially if data from multiple sources is combined to create more objective measures of a property's desirability (Liang et al., 2025).

1.3. Project Description

This project focuses on analysing parcel prices and their desirability in Slovenia. The project aims to combine cadastral data, real estate prices, and additional spatial parameters such as infrastructure, accessibility, slope, and environmental conditions. These datasets will be integrated into a Spatial Data Infrastructure (SDI) and visualised through an interactive dashboard. Users can then generate reports summarizing their findings, which can support them in making more informed decisions when buying, selling, or evaluating properties.

1.4. Project Purpose

The purpose of this project is to improve transparency in the real estate market by providing an easy-to-use tool for analysing parcel prices in Slovenia. Currently, many people rely on scattered sources of information when trying to understand what a parcel is worth. This project addresses that gap by bringing together data from different sources into a single dashboard.

1.5. Project Benefits

The main benefit of the dashboard is that it helps users understand and visualize property values in a clear and structured way. Instead of relying only on price alone, users can explore additional spatial information, such as accessibility, land use, or biodiversity, that may influence a parcel's desirability. This gives users a more complete picture of what makes a property valuable.

2. Target Group & Personas

The target group includes private buyers and real estate agents. Final product of this project can be also beneficial to other stakeholders in housing market.

Personas were used as a method of creating realistic profiles that represent intended target group and helps align our project to their needs. For this project, we created two personas:

Persona 1: Ana & Luka Dončić (Private Buyers)

Ana and Luka Dončić are both 27 and newly married. Ana is a teacher and Luka is an economist. Now they want to move from a rented apartment in Ljubljana to their first owned home there. Their goal is to stay within their 250,000€ budget and find a quiet and green parcel within the city. Another important aspect for the two is that the commuting time to their workplaces should be manageable. So, the important aspects for them are next to the price, also the accessibility.

They both have rather low technical skills and it is hard for them to compare all parcels manually with considering price, infrastructure and the environmental surrounding at the same time.

Persona 2: Janez Novak (Real Estate Agent)

Janez Novak is 51 years old and a real estate agent in Ljubljana. He has over 20 years of experience and some technical skills. For many decisions and recommendations, he relies on his gut feeling and experience. But more and more customers request hard numbers and objective data from him to support his arguments. But manually cross-referencing the different aspects of each customer with the cadastral map or a bigger number of parcels takes a lot of time.

Therefore, Janez Novak wishes for a platform which he can use to provide his customers objective data regarding their needs. He also has the hope to spot hidden liabilities faster. For example, if there is a protected Natura 2000 area within the areas. He also wants to be able to generate pdf reports for the parcels to present the data to the customers in the clearest way possible.

3. Project Management

For Project Management different approaches were used. This included the creation of different Work Packages with Subtasks, setting Milestones, creating a GANTT-chart, and a Risk Matrix.

3.1. Work Breakdown Structure

The Work Breakdown Structure (WBS) represents Work Packages and their Subtasks and can be seen in Figure 1. Eight Work Packages were defined including all needed tasks for the project like data collection, data processing, the implementation with the development of a frontend and a backend, as well as the validation and finalization processes. In addition, there were also Work Packages for Project Management and Documentation and for the two presentations that were held during the project.

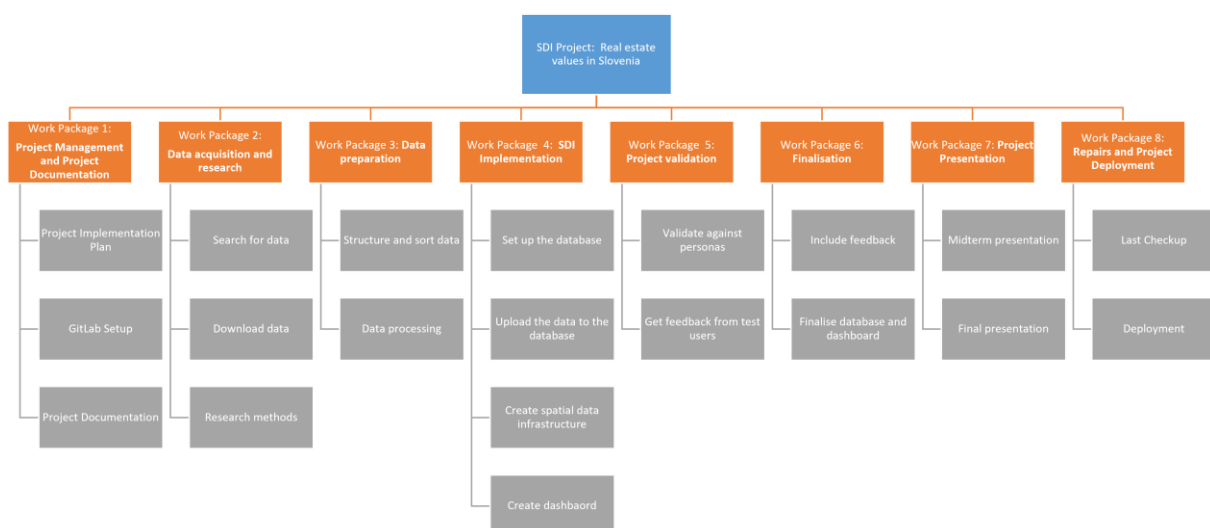


Figure 1. Work Breakdown Structure (WBS)

Work Package 1

The first WP includes Project Management and Project Documentation. It is the only WP that starts at the beginning of the project and lasts till the end. It includes tasks like defining a Project Implementation Plan (PIP), setting up a GitLab for Project Management and the documentation with a final report at the end.

Work Package 2

The second WP is about data acquisition and research. Here some methods and background information regarding the project topic were analyzed. Also, the acquisition of possible suitable data is included here.

Work Package 3

The third WP is then to prepare the gained data for the implementation of the dashboard by sorting, structuring, and processing the data. This includes joins, distance calculations, and classifications.

Work Package 4

The fourth WP is the SDI Implementation. Here, a database is prepared, and everything is uploaded to this database. It also includes the creation of the Spatial Data Infrastructure to later provide all the data in the dashboard. This can be described as the backend development. Lastly also the creation of the dashboard itself belongs to this WP what can be seen as the frontend development.

Work Packages 5 & 6

WP five and six are about the validation and finalization of the project. Therefore, test users give feedback, and the project is validated against the personas. Afterwards in Workpackage six this feedback gets included and the project gets finalized.

Work Package 7

WP seven includes the two presentations of the project. These were the midterm presentation to present the status of the project halfway and the final presentation at the end of the project.

Work Package 8

WP eight then is the deployment of the project and some final repairs after the final presentation.

3.2. GANTT Chart

To visualize the temporal distribution of these Work Packages a GANTT Chart was created showing the specific timeline for the Work Packages and its responsible persons. The GANTT chart can be seen in Figure 2.



Figure 2. GANTT Chart

3.3. Milestones

In total six milestones were defined to be reached during the project. Including finishing data collection and preparation (processing), creating the dashboard and the database and finishing the project documentation in the end. The Milestones and their timely distribution can be seen in Figure 3.

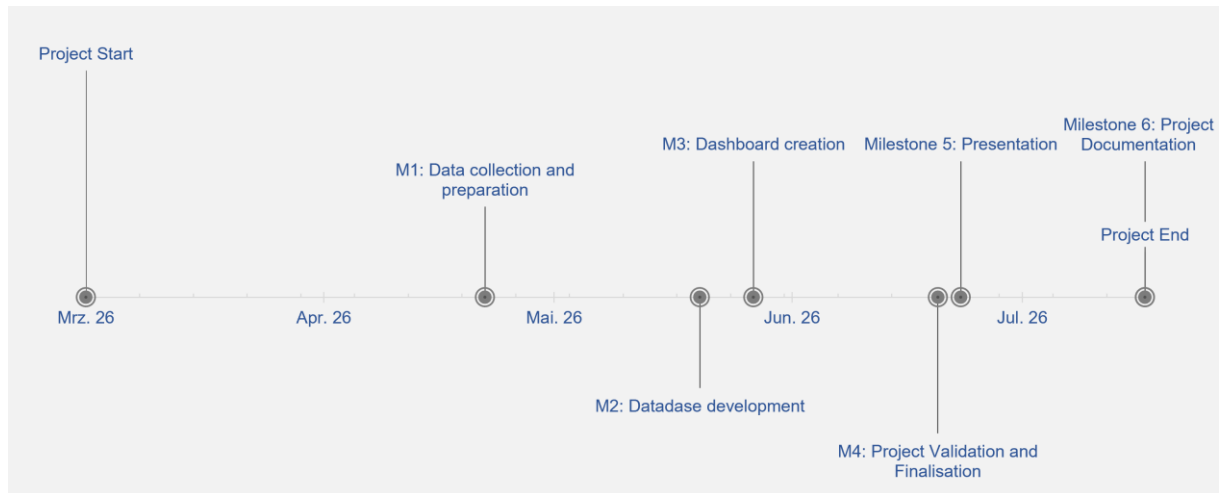


Figure 3. Milestones

3.4. Risk Matrix

For identifying and avoiding risks a Risk Matrix was created. In this Risk Matrix each risk gets described and assigned a Risk Level as well as a person responsible for this risk. The risk levels reach from L (Low Risk) to M (Medium Risk), to H (High Risk), to C (Cleared Risk). The Risk Matrix can be seen in Table 1.

Table 1. Risk Matrix

No	Risk	Potential adverse impact	Risk Level	Risk Management Strategy	Responsibility
1	Missing or incomplete data	Limits analysis quality	M	Use alternative datasets	Timotej
2	Data incompatibility	Delays in integration	M	Data cleaning and standardization	Team
3	Technical issues with SDI/dashboard	Delays development	M	Use tested tools and support	Noah
4	Time constraints	Incomplete project	H	Clear planning and deadlines	Team
5	Low user feedback	Weak validation	L	Ensure enough test users	Team

3.5. GitLab

Link to GitLab:

https://git.sbg.ac.at/st26_856.213/sdi_pdas//tree/40aa6c33e650b059de3dca9f73187d048111c464/

To bring all this information together in a clear way the platform GitLab was used for Project Management. The GitLab contains different folders where Code, Literature, Metadata, and Data can be saved and reached by every team member. All Tasks were defined as issues with date, assignee, and a short description of the task. A label represented the Work Package the task belongs to. All these issues can be moved between three sections in the so-called issue board representing open tasks, in progress tasks, and closed tasks. The issue board shortly before project ends can be seen in Figure 4.

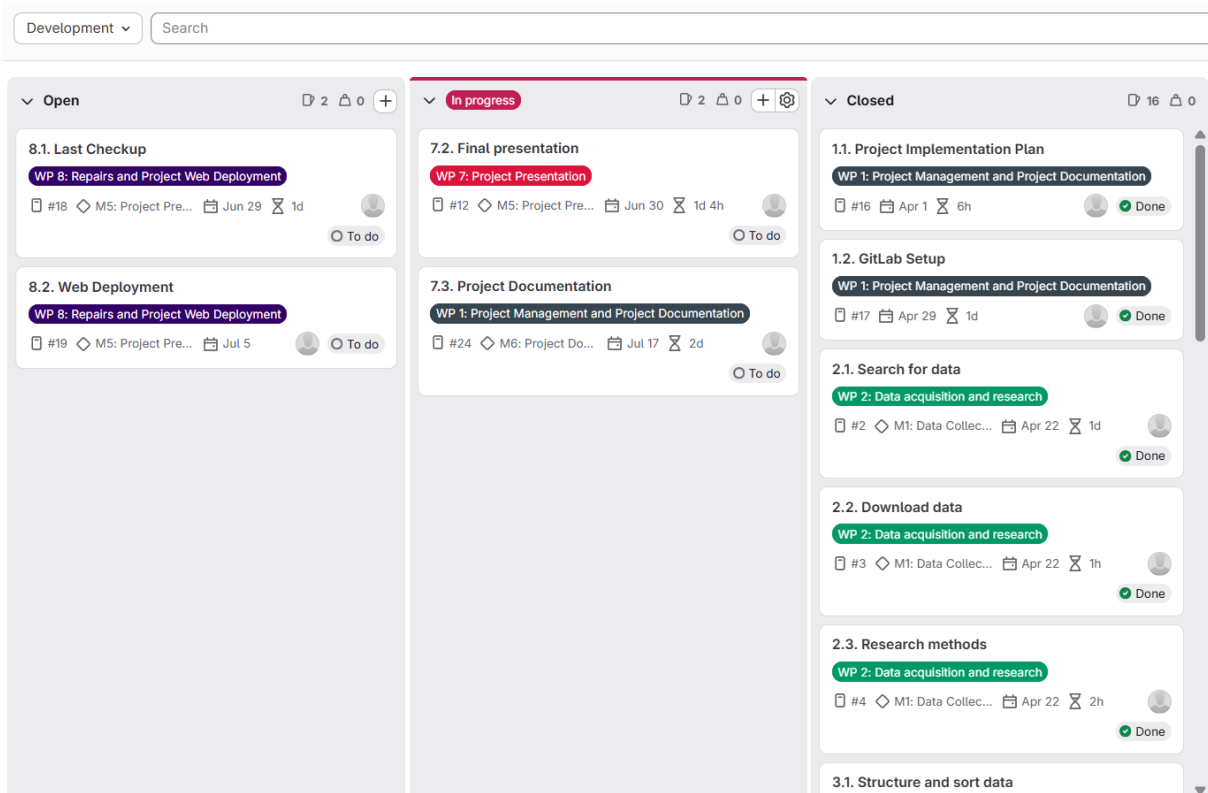


Figure 4. GitLab Issue Board

4. Data

The following section provides further information on the data used in this project. Next to the mandatory datasets (weather data, biodiversity data, and land-use data) also some other datasets were needed, like accessibility information, specific services or an elevation model. The sources, information on data processing, and the Metadata will be provided in the following.

4.1. Data Sources

To be able to create a dashboard, and to gather enough information to fulfill the needs of the defined target group data, we used several different sources.

The data that was used within the project comes from five different sources. These are mainly from Slovenian governmental sides combined with some data which was retrieved from Open Street Map (OSM) using Overpass Turbo. The query used in Overpass Turbo can be found in the Appendix (A1). Table 2. provides an overview of all datasets and their source.

Table 2. Data Sources

Source	Dataset	Link
Atlas Okolja	Weather data: Average Temperatures, Average Precipitation	Atlas okolja
Javni Geodetski Podatki (Portal JGP)	Cadasters, Prices, DEM	JGP
European Environmental Agency Datahub	Natura2000 (Biodiversity)	Natura 2000 data - the European network of protected sites
Open Street Map (OSM)	Accessibility: Roads, Train Stations; Services: Schools and Health Care Facilities	overpass turbo
Ministry for Agriculture, Forestry and Food (MKGP)	Land-Use	MKGP – Portal

4.2. Data Processing

To make this data usable for the project a few data processing steps were needed. As a first step the cadaster dataset was joined with the price dataset using the shared field of the parcel ID. The result of this step is a layer containing price information for each parcel.

The second processing step refers to the Digital Elevation model. From the DEM Slope, Aspect and Hillshade were calculated within ArcGIS Pro and then classified into five classes. This information will be later visible as additional information layers within the dashboard.

To receive the information needed on accessibility and services from Open Street Map Overpass Turbo was used to query those. Afterwards the point data for representing schools and health care facilities as well as the point data for train stations and the line data for the highways was imported to ArcGIS Pro. Here the distance from each parcel to the next train station/highway/school or health care facility was calculated with a distance accumulation tool. This information will then be provided for each parcel with distance and name of the facility.

4.3. Metadata

Metadata was created on GeoNetwork. Out of 16 layers, 10 are original layers received from one of the sources provided in section 4.1. and 6 are created within the project. A short overview of Metadata can be seen in Table 3.

Table 3. Metadata

Metadata	Contained Datasets	Source	Data Type	Spatial Resolution	Temporal Resolution	Original SRS	License
5m DEM	DEM Slope Aspect Hillshade	Portal JGP	Raster	5m		EPSG 3794	CC-BY 4.0
Average Temperature	Temperature (in °C)	Atlas Okolja	Raster		30-year timeframe (1981-2010)	EPSG 3794	CC-BY 4.0
Average Precipitation	Precipitation (in mm)	Atlas Okolja	Raster		30-year timeframe (1981-2010)	EPSG 3794	CC-BY 4.0
Cadaster and Prices	Cadaster data Price data	Portal JGP	Vector		Continual, daily	EPSG 3794	CC-BY 4.0
Infrastructure	Education Healthcare Roads Train Stations	OSM (Overpass Turbo)	Vector			WGS 84	Open Database License (ODbL)

Natura 2000 areas	Natura 2000 Protected areas	European Environmental Agency Datahub	Vector	100km	Annually	ETRS89 / LAEA	CC-BY 4.0
Land Use	Land-Use	MKGP	Vector	25cm		EPSG 3794	CC-BY 4.0
Closeness to Healthcare	Distance to health care facilities	OSM (own calculations)	Raster	10m		WGS 84	Open Database License (ODbL)
Closeness to Train Station	Distance to next train station	OSM (own calculations)	Raster	10m		WGS 84	Open Database License (ODbL)
Closeness to Education	Distance to next school	OSM (own calculations)	Raster	10m		WGS 84	Open Database License (ODbL)
Closeness to Major Road Network in Slovenia	Distance to the next highway	OSM (own calculations)	Raster	10m		WGS 84	Open Database License (ODbL)

5. Project Implementation

For the implementation of this project, a spatial database was established and integrated into a Spatial Data Infrastructure (SDI). This was done to enable the storage, processing, and visualization of spatial data through an interactive user dashboard. The following chapter will provide a detailed explanation of the used SDI methods, the system architecture and the specific implementation phases.

5.1. SDI Methods

For the implementation of the project different SDI methods were used, which will be explained in the following (Figure 5.).

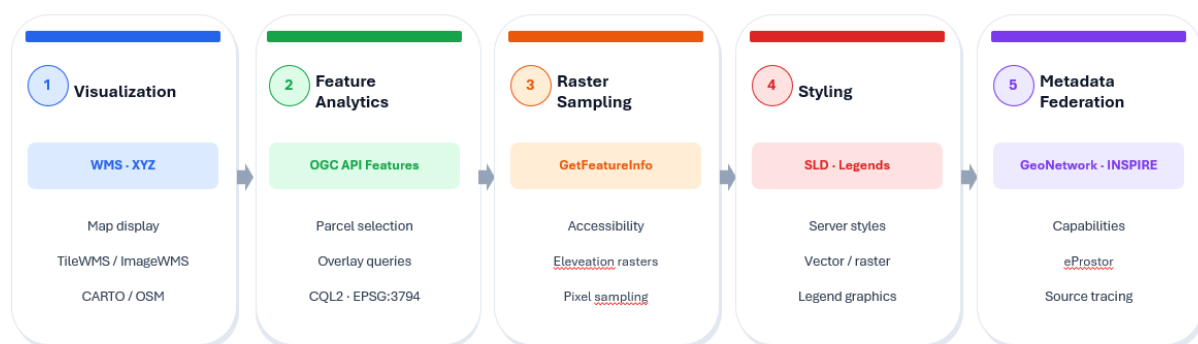


Figure 5. SDI Methods

Visualization

As a first step the visualization of the map layers was done. This step is crucial for the representation of the maps in the frontend and to provide maps to the user. It can be seen as the foundation for all other interactions with the map. Map visualization was primarily provided through WMS 1.3.0. GeoServer and returns server-rendered map images through GetMap, while OpenLayers requests tiled WMS layers for responsive display. CARTO Positron and OpenStreetMap were integrated as external XYZ basemaps. XYZ defines the tile-addressing scheme, while caching is handled by the respective provider or deployment.

Feature Analysis

Vector features required for parcel analysis were queried primarily through OGC API – Features v1 and returned as GeoJSON. Requests use bounding boxes, selected properties, feature limits, and, where required, CQL2-text attribute filters. WFS 1.1.0 was retained as a secondary configurable feature-access strategy. The analytical requests used EPSG:3794 so that distances and areas can be calculated in meters.

Raster Sampling

Raster values were sampled through WMS GetFeatureInfo. For the four accessibility rasters, the client has sent a small 3×3 pixel request covering a $20 \text{ m} \times 20 \text{ m}$ area

around a representative point within the selected parcel. The returned class value was then displayed in the dashboard. DEM, slope, aspect, and hillshade are primarily provided as contextual WMS layers rather than being transferred entirely to the browser.

Styling

Cartographic portrayal was defined centrally through Styled Layer Descriptor (SLD) 1.0.0. Eighteen styles—ten for vector layers and eight for raster layers—defined colors, symbols, categorical rules, scale-dependent visibility, raster ColorMaps, and transparent NoData values. GeoServer applies these styles before returning the WMS images, ensuring a consistent visualization across clients.

Each layer on the dashboard can be toggled on and off, with a direct link to its corresponding WMS service and metadata (Figure 6). Also, the legend gets defined here (Figure 7). This was done for all the data (vector and raster data) as well as for the legends.



Figure 6: Implementation of the Layers in the Dashboard

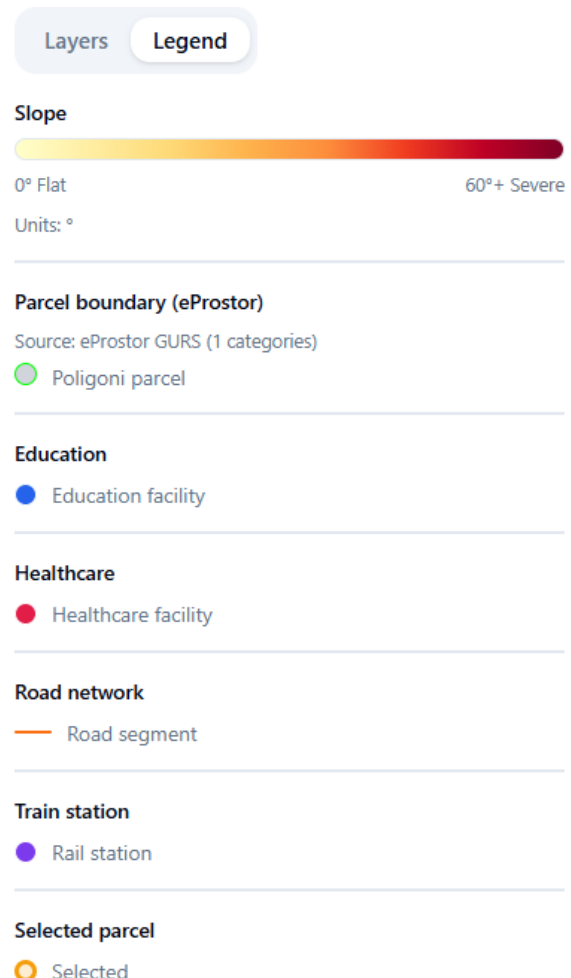


Figure 7: Implementation of the Dynamic Legend in the Dashboard

Metadata Federation

Metadata federation connected the operational layers with their descriptive and discovery information. As already mentioned in Chapter 4.3 Project metadata was maintained in GeoNetwork 4.2.1.0 using ISO 19115/19139 records, while external cadastral and land-use layers link to the Slovenski INSPIRE metadata catalogue. The dashboard uses layer-specific UUIDs to provide direct links to metadata records and WMS GetCapabilities documents.

5.2. SDI Architecture

The SDI Architecture can be divided into different logical levels which can be described as tiers (Figure 8.). The separation reduces coupling between the browser, services, and data stores. Consequently, an external data source, service endpoint, or client component can be replaced without redesigning the complete infrastructure. Communication between the tiers takes place through standardized interfaces rather than direct database access.

These tiers are:

1. Presentation Tier
2. OGC Services Interfaces
3. Application Tier
4. Data Tier
5. External/Federated Sources

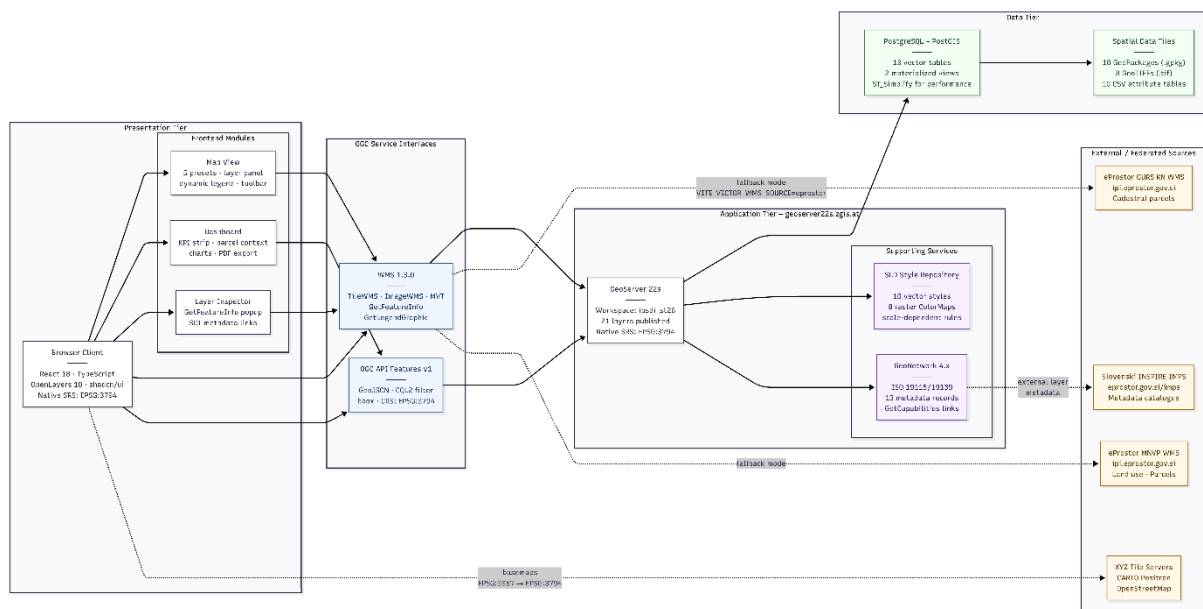


Figure 8. Overview over the SDI architecture

Presentation Tier

The presentation tier is the browser-based client through which users visualize layers, select parcels, inspect features, and access analytical results. Here, the user interaction and visualization get defined. The presentation tier includes three different frontend modules. These are Map View, the Dashboard, and the Layer Inspector.

The Map View is for displaying the layer panel, the dynamic legend, and the toolbar.

The Dashboard includes the KPI strip (Key Performance Indicators), the parcel context, and the pdf report function. The KPI is used for one of the most important parts of the dashboard as it is used to present the key indicators for each parcel after the user selects it (Figure 9.).

The Layer inspector enables the “GetFeatureInfo” pop-ups and the metadata links.

The client was implemented using React 18 and TypeScript, with OpenLayers 10 providing map visualization and interaction. The interface components were implemented with shadcn/ui.

OGC Services Interfaces

The OGC service interface tier separates the presentation tier from the application and data tiers. WMS 1.3.0 provides the portrayal operations GetMap, GetFeatureInfo, GetLegendGraphic, and GetCapabilities. OGC API – Features v1 provides REST-oriented access to GeoJSON features through collection-based URLs and supports bounding-box, and the EPSG:3794 CRS, property, filter, limit, and pagination parameters. WFS 1.1.0 was retained as a secondary configurable feature-access service. The use of these common interfaces enables interoperability between the project GeoServer, the browser client, and external SDI components.

Application Tier

The third tier is the Application Tier and represents the backend. GeoServer was the central component of the application tier. In the workspace ipsdi_st26, it published 21 project layers—13 vector and eight raster layers—with EPSG:3794 as the native coordinate reference system. GeoServer exposes the layers through WMS, WFS, and OGC API – Features and applies the associated SLD styles.

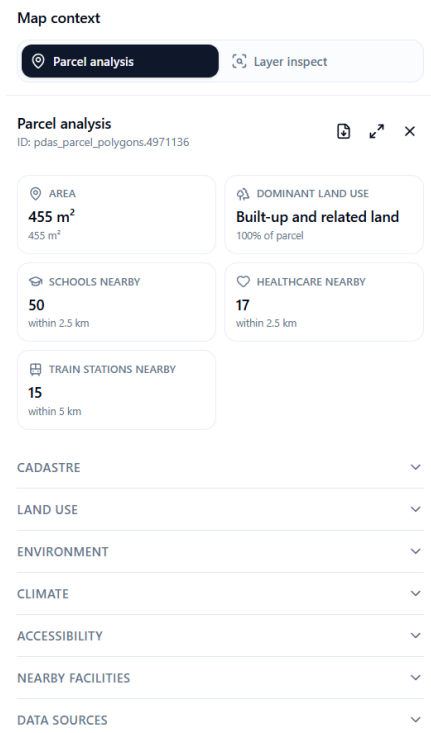


Figure 9. KPI

Data Tier

The data tier consists of PostgreSQL 13 with the PostGIS 3.3.1 extension for the 13 vector tables and two simplified materialized views. Eight raster datasets are maintained as GeoTIFF coverages and published through GeoServer. Portable source and archive formats are retained as GeoPackage, GeoTIFF, and CSV files.

External/Federated Sources

The External/Federated Sources tier enables the integration of external data to the SDI. The federated tier included the eProstor GURS cadastral WMS, the eProstor MNVP land-use WMS, the Slovenski INSPIRE metadata catalogue, and CARTO/OpenStreetMap basemap tiles. The parcel and land-use portrayal can be configured to use either the project GeoServer or the corresponding eProstor WMS. This provides a fallback publication source and demonstrates interoperability with the Slovenian national SDI.

5.3. SDI Implementation

The Implementation of the SDI can be split into five parts as shown in Figure 10.

1. Database Configuration
2. Service Publishing
3. Cartographic Design
4. Metadata Catalogues
5. Dashboard Analytics



Figure 10. SDI Implementation Steps

Database Configuration

The data tier contains 13 PostGIS vector tables and eight GeoTIFF raster datasets, resulting in 21 published project layers. All layers use EPSG:3794 as their native CRS. Two additional materialized views were created for the land-use and Natura 2000 datasets to support efficient analytical access.

The server-side work was performed on a headless university VPS running Ubuntu 24.04 LTS and administered through SSH. The GDAL/OGR command-line utility ogr2ogr was used extensively to inspect, reproject, convert, and import GeoPackage and other vector datasets into PostGIS. The PostgreSQL psql client was used to execute SQL, verify geometry columns and spatial reference identifiers, create spatial indexes, and create or refresh the materialized views.

Service Publishing

GeoServer publishes the project resources through standardized OGC interfaces. Tiled WMS is the primary map-rendering strategy, while OGC API – Features supplies bounded GeoJSON responses for parcel analytics. WFS 1.1.0 is retained as a secondary feature-loading option. WMS GetFeatureInfo is used by the layer inspector and for accessibility-raster sampling, while GetLegendGraphic and GetCapabilities expose portrayal and service information.

Cartographic Design

Centralizing portrayal in GeoServer ensures that every client receives the same cartography and prevents the browser from downloading complete national-scale vector datasets solely for visualization. Scale-dependent SLD rules also hide dense point layers at small map scales.

Metadata Catalogues

Project metadata is stored in GeoNetwork using ISO 19115/19139 metadata records. In the client configuration, each layer is associated with a GeoNetwork or INSPIRE UUID. The application uses these identifiers to construct links to the appropriate metadata records. Separate links to the WMS GetCapabilities document provide the technical service description.

Dashboard Analytics

When a parcel is selected, the dashboard executes up to 13 requests in parallel. These include feature requests for the parcel context, land use, Natura 2000, climate zones, nearby facilities, roads, and train stations, together with four WMS GetFeatureInfo requests for the accessibility rasters.

Bounding boxes, feature limits, timeouts, request cancellation, and short-lived caches reduce unnecessary server load. If an endpoint does not correctly process the EPSG:3794 bounding-box CRS, the client can transform the query extent to CRS84. Memory-related GeoServer errors trigger a retry with a smaller bounding box and a lower feature limit.

6.Result

The result of the project is a dashboard that fulfils the main purpose and idea set at the beginning (Figure 11.). Users can select individual parcels directly on the map to retrieve detailed information about them. For each selected parcel, the dashboard displays the area, the dominant land use, and the number of schools, healthcare facilities, and train stations within a 2.5 km radius. It also shows the parcel's estimated price, whether it is potentially located within a Natura 2000 area, and average temperature and precipitation values for the area.

Beyond this parcel-specific information, users can further explore the surrounding area by toggling additional map layers on and off, including the Digital Elevation Model (DEM), slope, aspect, and hillshade. These layers provide additional spatial context, which may influence a parcel's suitability or desirability.

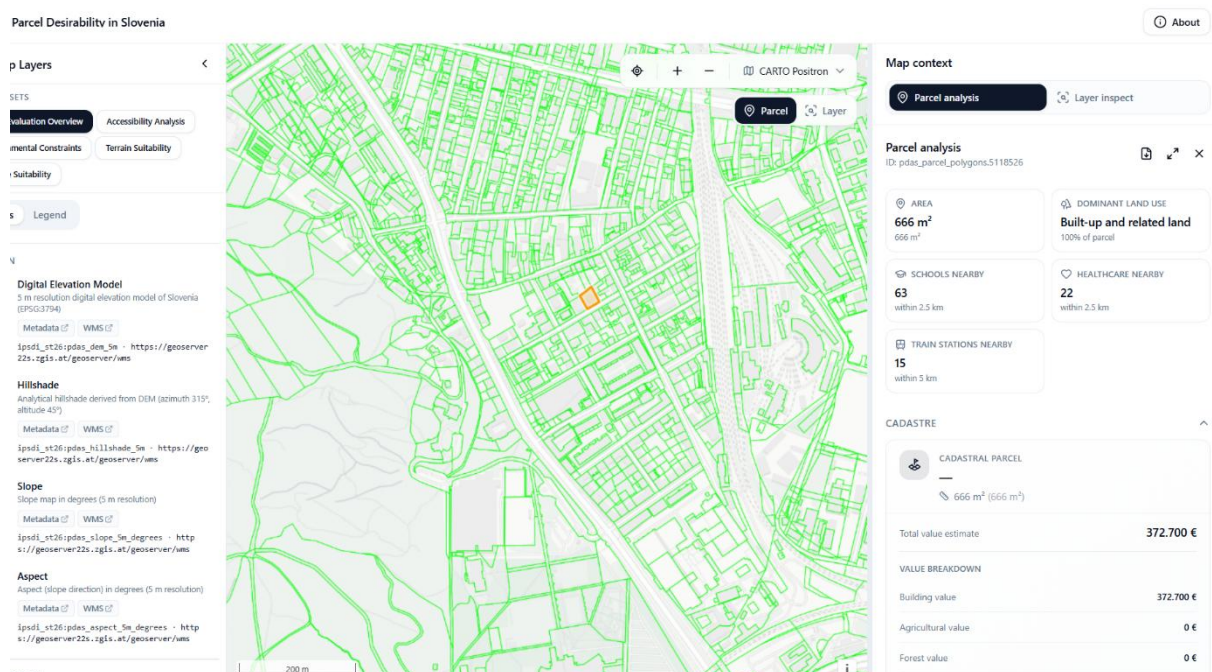


Figure 11: Dashboard

Finally, once users have identified parcels that meet their expectations based on the available parameters, they can generate a PDF report summarizing the relevant information. This allows users to compare selected parcels, share findings, or use the report to support further decision-making regarding potential purchase, sale, or evaluation. An example for a PDF report generated for a specific parcel in the Ljubljana area can be seen in the Appendix (A2).

7. Discussion & Outlook

Building this project also showed some limits and things that could be improved in the future. First, handling the large amount of data, especially data from outside sources, needed a lot of computing power. This is something to keep in mind if the dashboard is used and expanded in the future. The team also thought about adding several other parameters for parcel desirability, but after talking with the supervisors, decided to keep only the most necessary layers so the project could be finished in time.

The main focus of the project was building a solid architecture, and the team believes it managed to create a working Spatial Data Infrastructure (SDI). The dashboard works well and can be used by the target groups it was made for.

Looking ahead, the main goal, like with any service, is to keep meeting the needs of users over time. The current version already does its job, but some changes could still make it easier to use and navigate. One idea for future development is to offer the same service in a different, simpler format. Even though the dashboard shows a lot of useful information, it can still feel overwhelming for users with low tech skills, especially when it comes to manually browsing the map and clicking on parcels one by one. One way to improve this would be to make an AI chatbot powered by a large language model (LLM). Instead of clicking through the map, users could simply describe what they are looking for, like a certain location, budget, or closeness to schools and hospitals, and the chatbot could automatically suggest matching parcels. This would be much easier to use while still relying on the same data and analysis behind the project.

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Appendix

A1: Overpass Turbo Queries

Education

```
[out:json][timeout:90];
{{server=https://overpass.kumi.systems/api/}}
area["ISO3166-1"="SI"]->.searchArea;
(
  nwr["amenity"="school"](area.searchArea);
  nwr["amenity"="university"](area.searchArea);
  nwr["amenity"="college"](area.searchArea);
);
out center;
```

Healthcare

```
[out:json][timeout:90];
{{server=https://overpass.kumi.systems/api/}}
area["ISO3166-1"="SI"]->.slovenia;
(
  nwr["amenity"="clinic"](area.slovenia);
  nwr["healthcare"="clinic"](area.slovenia);
  nwr["healthcare"="centre"](area.slovenia);
  nwr["amenity"="doctors"](area.slovenia);
  nwr["healthcare"="doctor"](area.slovenia);
  nwr["amenity"="hospital"](area.slovenia);
  nwr["healthcare"="hospital"](area.slovenia);
);
out center;
```

Roads

```
[out:json][timeout:90];
{{server=https://overpass.kumi.systems/api/}}
area["ISO3166-1"="SI"]->.slovenia;
(
  way["highway"="primary"](area.slovenia);
  way["highway"="primary_link"](area.slovenia);
  way["highway"="secondary"](area.slovenia);
  way["highway"="secondary_link"](area.slovenia);
);
out geom
```

Train Stations

```
[out:json][timeout:60];
area["ISO3166-1"="SI"]->.a;
(
  node["railway"="station"](area.a);
  node["railway"="halt"](area.a);
);
out body;
```

A2: Parcel context report

Parcel context report

Parcel: pdas_parcel_polygons.4967393
Generated: 14. 7. 2026, 16:42:35
EPSG:3794

Summary

Metric	Value
Area	398 m²
Dominant land use	Built-up and related land
Natura 2000 overlap	None
Schools nearby	20
Healthcare nearby	3

Cadastre

Property	Value
Area	405 m²
Land quality index	—
Total value estimate	147.900 €
Building value	147.900 €
Agricultural value	0 €
Other value	0 €
Forest value	0 €

Land use

Category	Share of parcel
Built-up and related land	100%

Climate (1981–2010)

Variable	Range
Temperature	10–12 °C
Precipitation	900–1000 mm

Accessibility (raster sample)

Theme	Class at parcel point
Education	Class 5
Healthcare	Class 5
Roads	Class 5

Theme	Class at parcel point
Rail	Class 4

Nearby facilities

Type	Count in buffer	Nearest
Education	20	OSNOVNA ŠOLA KOSEZE (~431 m)
Healthcare	3	Dermatološko estetski center (~326 m)
Train stations	15	Ljubljana Litostroj (~1915 m)
Road proximity	9	—

A3: AI Declaration

We hereby declare that artificial intelligence (AI) was used within this project to support certain activities. The following tools were used:

- **Gemini ([Google Gemini](#))**: to create the codes for the overpass turbo queries (see A1)
- **DeepL (<https://www.deepl.com/de/translator>)**: for translating words and improve spelling and grammar
- **Cursor AI Coding Agent ([Cursor: AI coding agent](#))**: Using various Large Language Models (LLMs) for the development of the frontend application. Including the generation and refinement of code, suggesting component structures, troubleshooting errors, improving TypeScript implementations, and supporting the integration of React, Open Layers, and the user interface components.
- **Microsoft365 Copilot (<https://copilot.microsoft.com/>)**: was utilized for generating overview and flow charts

All AI generated content was checked by the authors.