

SINGLE-PROMPT CREATION OF WEB MAP APPLICATIONS FOR TOURISM AND NATURE PROTECTION USING OGC SERVICES

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Abstract

Generative AI tools increasingly claim that non-programmers can build interactive web maps. This study tests a single-prompt, no-iteration scenario: one identical “non-programmer” prompt was used to generate a purely client-side web mapping app consuming real OGC endpoints relevant to tourism and nature protection (hiking trails and large protected areas) from Slovak public registries. Three free-tier tools were evaluated (ChatGPT, Lovable, Replit) using (i) time-to-first-output in the tool's native environment and (ii) a 21-item binary functional checklist after self-host deployment. ChatGPT produced the fastest first output (1 min 16 s) and the highest functional score (17/21). Replit achieved comparable core functionality (15/21) but slower first output (7 min 33 s) and added unrequested GIS usability controls (e.g., layer ordering/opacity). Lovable generated a polished prototype but lower geospatial functionality (12/21). Self-hosting Vite-based outputs required additional build/routing adjustments (~10 minutes per app). Deployed versions used for evaluation and used single-prompt are available at: <https://map.iesprit.sk/promptapps/>.

Key words: generative AI; non-programmer; visitor information; client-side deployment

Introduction

Interactive web maps are widely used in tourism and recreation to support visitor information search and trip planning and to communicate spatial opportunities and constraints. Tourism research shows that WebGIS affects how users search for information and complete trip-related tasks (Chang, Caneday, 2011). In nature-based and “slow tourism” contexts, web mapping is frequently used to present routes and contextual layers through open web technologies (Brovelli et al., 2015).

In nature protection, the key challenge is balancing recreation demand with ecological sensitivity. Trail networks concentrate visitor use and can amplify erosion and trampling impacts; GIS-based modelling has therefore been applied to assess environmental sensitivity of recreational trails and support management decisions (Tomczyk, 2011). Visitor monitoring and visitor management are recurrent topics for protected and recreational areas, reflecting increasing visitation pressure and the need for evidence-based interventions (zoning, trail design, information measures) (Pickering et al., 2018). Spatial decision support and participatory approaches are also common: PPGIS can help capture place-based visitor experiences for park planning (Pietilä, Fagerholm, 2019), while web-oriented geospatial decision support systems have been proposed for sustainable tourism and ecotourism planning to translate spatial data into actionable outputs for stakeholders (Mileti et al., 2022).

Despite interoperable geospatial web services, building a tailored web map application remains a technical task. Large language models (LLMs) and generative AI may reduce this barrier; a recent systematic review documents rapidly expanding LLM use in geospatial science, while emphasizing output variability and the continuing need for domain knowledge to avoid critical errors (Wang et al., 2024). This study addresses a practical gap for tourism and nature protection practice: what can a non-programmer obtain from a single prompt when creating a lightweight, client-side web map that consumes real Open Geospatial Consortium (OGC) services and can be deployed on a self-hosted server?

Material and methods

We performed a comparative single-prompt, no-iteration evaluation intended to approximate a “first-try non-programmer” scenario. The same natural-language prompt was submitted once to each tool; no follow-up prompts (clarifications, bug fixes, or retries) were allowed. Three free-tier tools were tested (ChatGPT free, Lovable free, Replit Lite/free), each accessed via a Google (Gmail) login under free usage conditions. Tests were executed in February 2026 on the same workstation and browser.

The prompt (English, intentionally minimal IT terminology) requested a purely client-side web map application using OGC web services for (i) hiking trails and (ii) large protected areas (VCHÚ), with layer toggles, a legend, click-to-identify popups, and a basic layer/service information panel. Two optional functions were included: polygon-based listing of trails and adding an external WMS layer by

URL. The application consumed publicly available WMS/WFS/WMTS endpoints relevant to tourism and nature protection; exact service URLs and layer/type names are reported in Table 1. For each tool, time-to-first-output (mm:ss) was measured from prompt submission to the first output in the tool’s native environment: ChatGPT response completion versus first rendered app preview in Lovable/Replit. All outputs were then exported and deployed to a self-hosted web server to verify portability. ChatGPT output was deployable as a single static HTML file; Lovable/Replit outputs were Vite projects requiring a production build and subfolder base-path/routing adjustments (≈10 minutes of junior developer effort per app), recorded separately from time-to-first-output. Functionality was assessed after deployment using a 21-item binary checklist (YES/NO) covering map load/interaction, both thematic overlays, layer toggling, legend behaviour, WFS identify, the information panel, and optional tools. Service-derived legends were treated as compliant; invented legends were considered non-compliant unless clearly labelled as fallback. Features added without being requested (e.g., layer opacity/order, in-app guidance) were documented separately and not counted toward the core checklist score.

Results

Deployed versions used for evaluation and used single-prompt are available at: <https://map.iesprit.sk/promptapps/>.

Time-to-first-output (mm:ss) differed across tools: ChatGPT produced a complete response in 1 min 16 s, Lovable rendered an in-platform preview in 3 min 14 s, and Replit rendered an in-platform preview in 7 min 33 s. After self-host deployment, the overall functional checklist scores (YES/21) were 17/21 for ChatGPT, 15/21 for Replit, and 12/21 for Lovable. Table 1 summarizes the single-prompt outcomes and the minimal self-host deployment effort across the three evaluated tools.

Tab. 1: Single-prompt results (compact summary after deployment)

Metrics	ChatGPT	Lovable	Replit
Prompts used (n)	1	1	1
Plan / access	free	free	Free
Time-to-first-output (mm:ss)	01:16	03:14	07:33
Use of open-source libraries	yes	yes	yes
Top bar with the title “Smartland”	yes	yes	yes
Working “Contacts” button	yes	yes	no
The map loads and pan/zoom works	yes	yes	yes
The basemap (OSM) displays correctly	yes	no	yes
The WMS layers “Hiking trails” and “Protected areas” are displayed	yes	no	yes
A layer list exists and toggling works for both layers	yes	no	yes
A legend exists for both layers	yes	yes	yes
The legend is retrieved from the web services	yes	yes	yes
A layer’s legend is removed from the overall legend when the layer is hidden (and reappears when shown)	yes	yes	yes
Clicking a feature shows a popup with attributes	yes	no	yes
Clicking outside a feature shows a “not found” popup	yes	no	yes
A list of all attributes is displayed	yes	no	yes
A metadata panel exists	yes	yes	yes
Displays at least: layer name + source link	yes	yes	no
Displays Title/Description from capabilities	no	yes	no
Polygon drawing works	yes	no	no
Polygon search returns a list of trails (at least one result somewhere)	no	no	no
Add external WMS tool exists	yes	yes	yes
Add external WMS adds a layer and it appears in the layer list and legend	no	no	no
In Add external WMS, it is possible to display the list of layers from the added service	no	yes	yes

Core “map viewer” requirements were met more consistently by ChatGPT and Replit. Both displayed the thematic overlays for hiking trails and protected areas and provided working layer toggles. Both also implemented click-to-identify behaviour with attribute popups and an explicit “Nothing found” response when clicking outside target features. Lovable produced a visually polished prototype but did not achieve equivalent geospatial functionality after deployment, particularly for WMS/WFS-driven overlay handling and feature identification.

Legend behavior differed in fidelity: service-derived legends were achieved for ChatGPT and Replit, while Lovable relied on a fallback approach rather than consistently retrieving the legend from the service. The layer/service information panel was only partially fulfilled across tools: Lovable surfaced a name/source link and also reported Title/Description from capabilities, whereas ChatGPT and Replit did not consistently expose the requested service metadata.

Optional functions were the least robust. Polygon drawing was present only in the ChatGPT output, but polygon-based trail listing was not completed successfully in any tool. All three included an “add external WMS” interface, yet none fully satisfied the requirement of adding an arbitrary external layer such that it appeared correctly in both the layer list and legend after deployment.

Deployment effort differed substantially. ChatGPT output was directly deployable as a single static HTML file. Lovable and Replit outputs required a Vite build and subfolder base-path/routing adjustments for self-hosting (≈10 minutes of junior developer effort per application). Replit additionally introduced several unprompted GIS usability controls (e.g., layer ordering and opacity settings, and an in-app manual), which were documented separately and not counted toward the core functional score.

Discussion

The single-prompt results suggest that non-programmers can obtain a useful first prototype for tourism and nature-protection web mapping, but mainly for “map viewer” fundamentals: showing authoritative layers, switching them on/off, and inspecting features on click. These functions map well to practical communication needs in recreation and protected-area contexts (e.g., presenting trail infrastructure together with protection layers).

The prototype interface generated by prompt-based platforms (e.g., Replit, Lovable) appears visually complete (Fig. 1), including layer switching and legend rendering from WMS services, yet several advanced GIS functions required iterative refinement. A key implication is that visual completeness is not equivalent to functional correctness. For protected-area communication, feature identification and service-derived legends reduce misinterpretation risk. When these elements are missing or replaced by fallback/invented behavior, an attractive interface can still mislead users, which is a risk in environmental decision contexts.

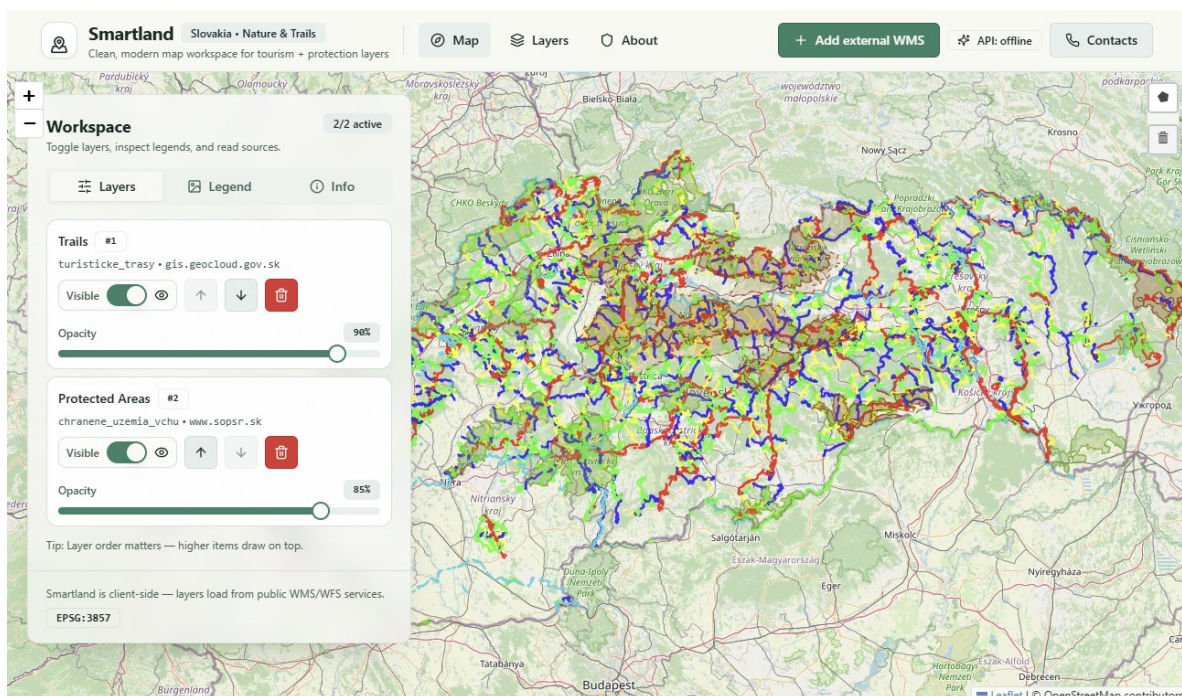


Fig. 1: Prototype of the interactive web map integrating hiking trails and protected areas via WMS services from Replit application

The study also highlights a gap between generating a working preview and publishing a stable self-hosted tool. Even when a platform produces a runnable prototype in its own environment, deployment to a subdirectory on a standard web server can require build and routing/base-path adjustments. In practice, prompt-based tools therefore support rapid prototyping and stakeholder communication, while production publication still benefits from minimal web/GIS deployment knowledge or brief developer support.

Finally, the least robust requirements were those that hide substantial technical complexity behind a simple user story: polygon-based trail listing and adding arbitrary external WMS layers with full integration into the layer list and legend. These functions depend on correct spatial querying, capabilities parsing and CRS consistency. This suggests a realistic boundary for first-try, non-programmer use: single-prompt tools can reliably produce lightweight map viewers, but more “GIS-like” functions typically require iteration or expert input.

Conclusion

This study shows that a single, non-programmer-style prompt can produce a workable client-side web map prototype for tourism and nature protection when the goal is primarily a lightweight map viewer (displaying authoritative layers, basic layer control, and click-to-identify behaviour). However, the experiment also demonstrates clear limits for first-try generation: tasks that require deeper GIS logic and integration—such as polygon-based spatial querying and robust addition of arbitrary external WMS layers with full legend/layer-list integration—were not reliably achieved without iteration.

A second practical conclusion is that “working in the platform preview” does not guarantee easy adoption outside the platform. Exporting and self-hosting may require build and base-path/routing adjustments, meaning that successful operational use still benefits from minimal GIS/web deployment literacy. Overall, prompt-based tools have strong potential to democratize map prototyping in tourism and environmental practice, but production use should include lightweight verification of legends, identify results, and data sources.

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Souhrn

Jedním promptem lze vytvořit použitelný prototyp klientské webové mapové aplikace pro cestovní ruch a ochranu přírody, pokud jsou požadavky omezeny na základní funkce „mapového prohlížeče“ (zobrazení a ovládání vrstev a identifikace prvků kliknutím). Pokročilejší GIS funkce (dotazy nad

polygony, robustní integrace externích WMS služeb) a nasazení na vlastním serveru obvykle vyžadují další technické kroky nebo podporu odborníka.

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