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“Base Map” - a new vector tiles-based map for mobile applications

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Abstract:

The cartographic products of swisstopo have undergone numerous technological changes in their history and have constantly adapted to user needs. With the advent of the internet, the emergence of web maps and the mobile use of geodata on smartphones, maps are becoming increasingly widespread and used as information carriers in a variety of ways. However, expectations regarding the dissemination of information with digital maps have also changed fundamentally. With this in mind, swisstopo has launched the “Next Generation Map” project to provide maps specifically designed for mobile use in addition to the existing national maps in digital and printed form.

A new base map for Switzerland and Liechtenstein

One of the results of the project is a new base map. The “Base Map” is a web-based dynamic map visualisation using vector tiles and supplements swisstopo's existing offering with a mobile map. It is similar in complexity to the classic national map, but the map design has been optimised for smaller map extents in order to meet the requirements of smartphones, including the small display size. Some of the principles of the classic map design have been deliberately omitted to improve performance and readability. While the classic national map is designed for different scales, the “Base Map” follows a consistent design logic with smooth transitions in the sense of dynamic zooming. Cartographic generalisation is carried out fully automatically in the derivation process of the “Base Map” depending on the capabilities of the technology used. The terrain typical of the Swiss national map, including shading, rock and scree depiction, is converted into a completely vector-based representation in order to increase performance and minimise storage space for offline use. The high visualisation quality is nevertheless retained. The entire “Base Map” thus requires less than 3 GB of storage space for Switzerland and Liechtenstein.

The Base Map” as part of the “swissMapWeb” product line is available free of charge in the sense of Open Government Data. Swisstopo provides an interface (API-REST Services) that can be used to integrate the web maps into applications (https://www.geo.admin.ch/en/vector-tiles-service-available-services-and-data).

From data-driven to user-centred thinking

Mobile map applications are particularly beneficial when used in real time, at the moment when relevant information is needed for orientation, wayfinding or searching. The availability and accessibility of useful information at the time of use are crucial for user acceptance. The need for real-time information is particularly high. Nowadays, a lot of such user-relevant data is available from different providers and on different platforms. The “Base Map” combines these data from various sources and links swisstopo's own data with data from partner organisations. The “Base Map” serves as a central interface to further information and closes the gap between static information visualised on the map and the dynamic integration of information via data interfaces from third-party providers. Additional information is displayed to the user via interactive map elements such as points of interest (POI) or labels. Particular attention was paid to the design of the POI icons to ensure that they are intuitively comprehensible and follow established standards. The icons are kept in a standardised design language and maintain a Swissness while harmoniously complementing the “Base Map”. The user can obtain further information by interacting with these map elements. The map thus becomes the key to accessing information that exceeds the mere map display.

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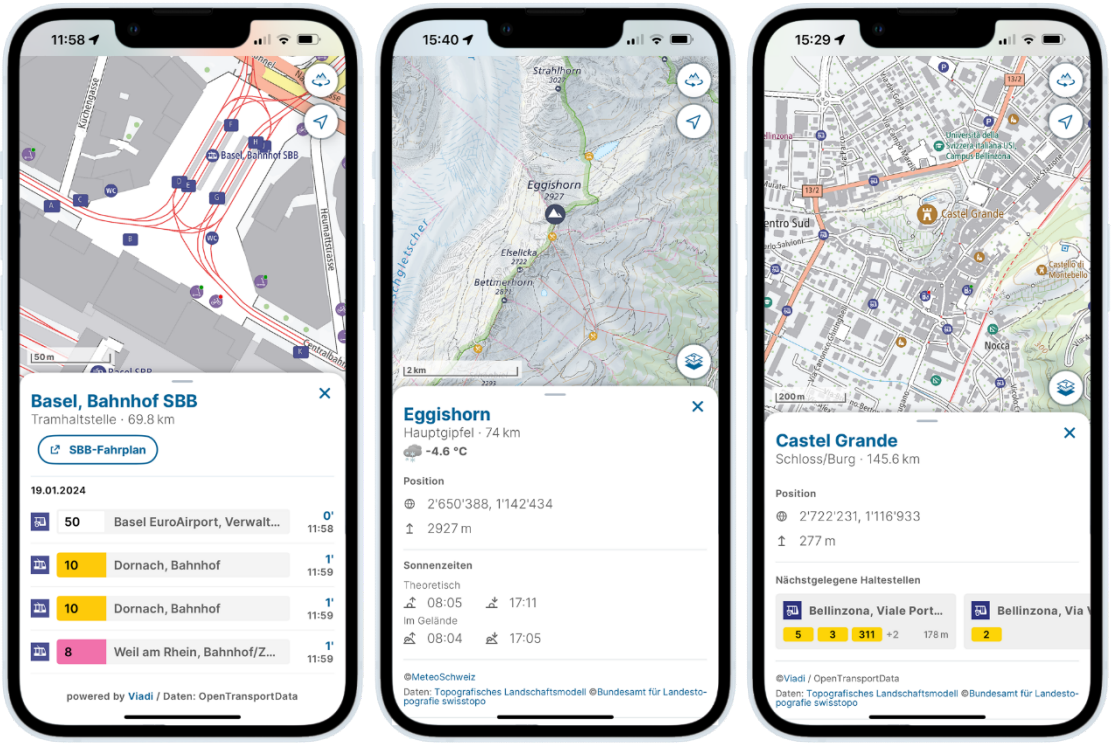
Showcase swisstopo app

The “Base Map” has been integrated into the swisstopo app as a new map type. The aim is to improve the user experience with the direct interaction possibilities of the map on the one hand and to demonstrate the potential of the new vector-based map for other applications on the other. New features have been implemented in this context. Among other things, relevant address details and real-time information on POIs are now displayed directly on the map and in the context menu. The interaction with public transport stops has been improved. Real-time information about upcoming departures is displayed directly in the app. Platforms or stop positions for the relevant departures are displayed on the map contextually and help the user to find the right route. In addition, the closest stops are linked to each POI and can be selected interactively. For outdoor-relevant POI, current weather data from MeteoSwiss as well as sunrise and sunset times are shown. The integration of the “Base Map” also contributes to the prevention of natural hazards. In a first use case in collaboration with the Federal Office for the Environment, current forest fire hazards and cantonal fire protection measures are linked to firepits shown on the map. In this way, map users can be visually alerted to possible dangers associated with firepits and receive detailed information in the context menu. An expansion of the context-orientated, POI-based warning of further natural hazards will be evaluated for the future.

Future developments

The “Base Map” was launched as a minimum viable product (MVP) and represents an initial functional version. It will be continuously improved on the basis of user feedback. For this purpose, swisstopo will conduct a user survey in spring 2024 to obtain direct feedback on the “Base Map” and to enquire about specific user needs. In particular, the expansion of additional points of interest, the further integration of real-time information and its visualisation as well as the expansion of interaction options between the map and app will be prioritised.

In addition, there are currently various collaborations with research institutions to evaluate approaches for the use of artificial intelligence in the map derivation process and to develop approaches for the visualisation of landmarks and context-oriented map representation. The findings will also be incorporated into the future development of the “Base Map”.



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