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ATLAS OF SWITZERLAND

Redesigning the User Interface of the Atlas of Switzerland for the web

ICC 2025 conference, Vancouver

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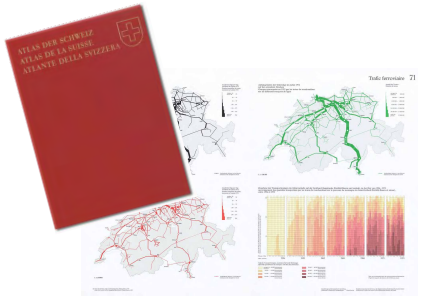
From printed maps to modern web technologies
Evolution of the Atlas of Switzerland

1961 2000 2004 2010 2016 2025

printed edition



1965-1997: 13 deliveries with 596 single maps, text and charts. Mostly at 1:500k scale

AoS 1 (CD-ROM)

choroplethe maps
panoramas, block images. 250 maps.

AoS 2 (DVD)

plus atmospheric effects, raster maps, scaled symbols, analytical tools, 1000 maps.

AoS 3 (DVD)

plus stars, network maps, extruded prism maps, many analytical tools, 1700 maps.

AoS 4 (App for download)

based on interactive virtual globe with online backend, realtime-rendering, 3D only, 400 maps.

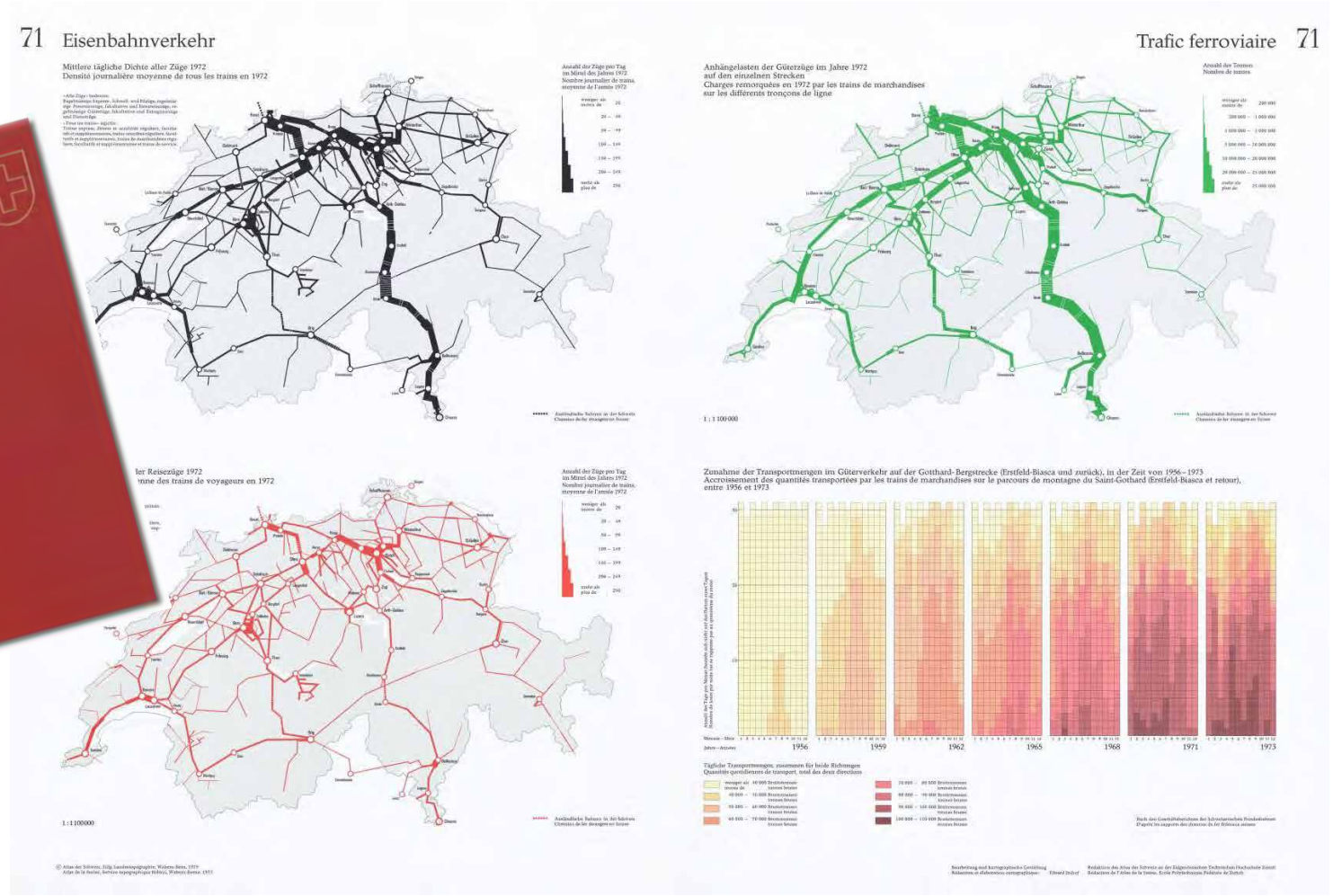
AoS 5 (Web-Atlas)

For desktop, tablets and mobile. Initially 2D only, later also 3D. Based on modern web frameworks.

From printed maps to modern web technologies
Evolution of the Atlas of Switzerland

1961 - 2000
Printed atlas

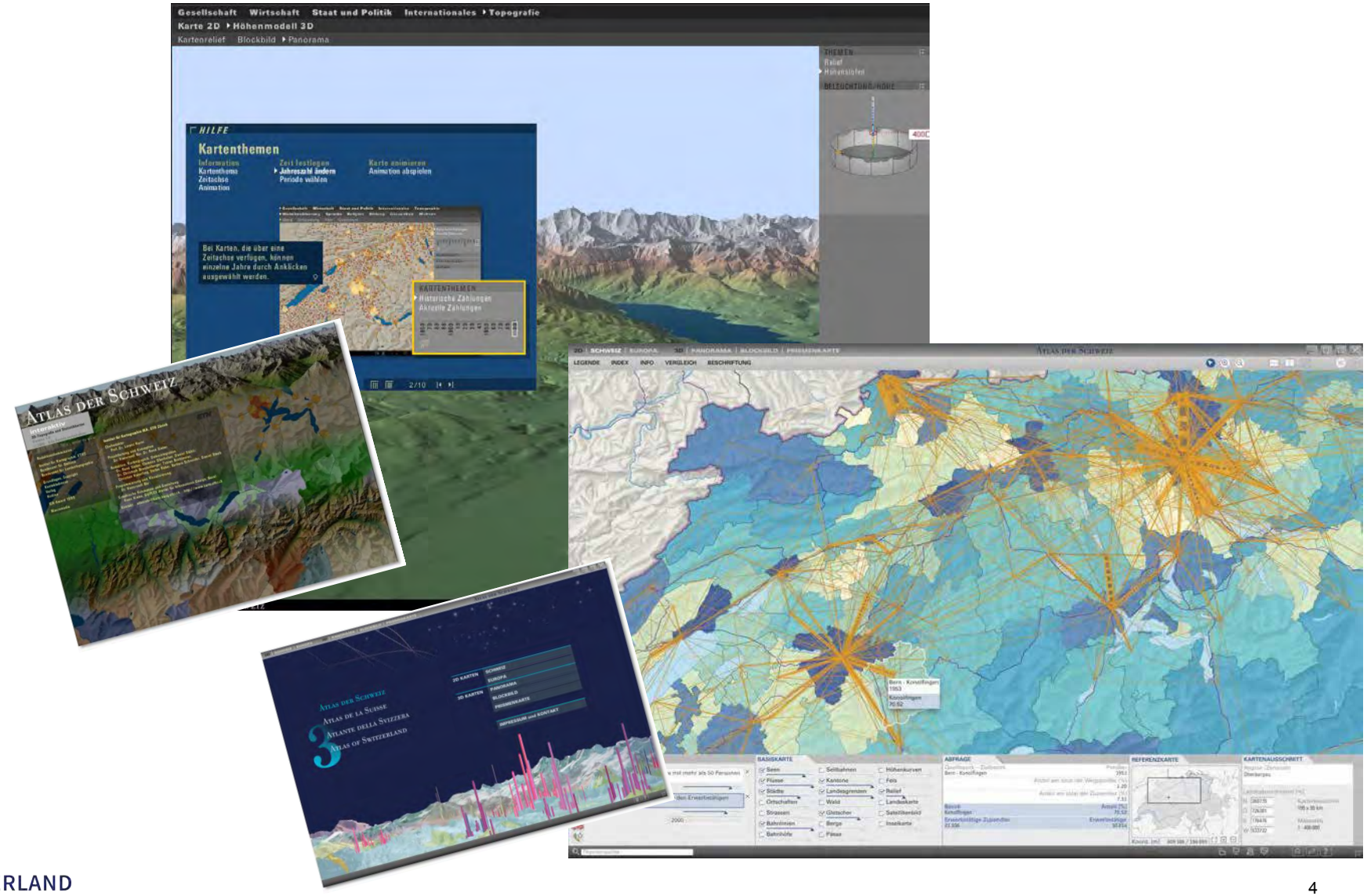
- Initiated in 1961 by Prof. Imhof and the Swiss federal government.
- Edited by the Institute of Cartography at ETH Zurich.
- Two editions completed 1965-1997, consisting of 13 deliveries with 596 single maps.
- Most maps created at a 1:500,000 scale, suitable for national and regional subjects.
- Renowned for the meticulous construction of maps and high-quality presentation.



From printed maps to modern web technologies
Evolution of the Atlas of Switzerland

2000 - 2015
Atlas v1, v2, v3

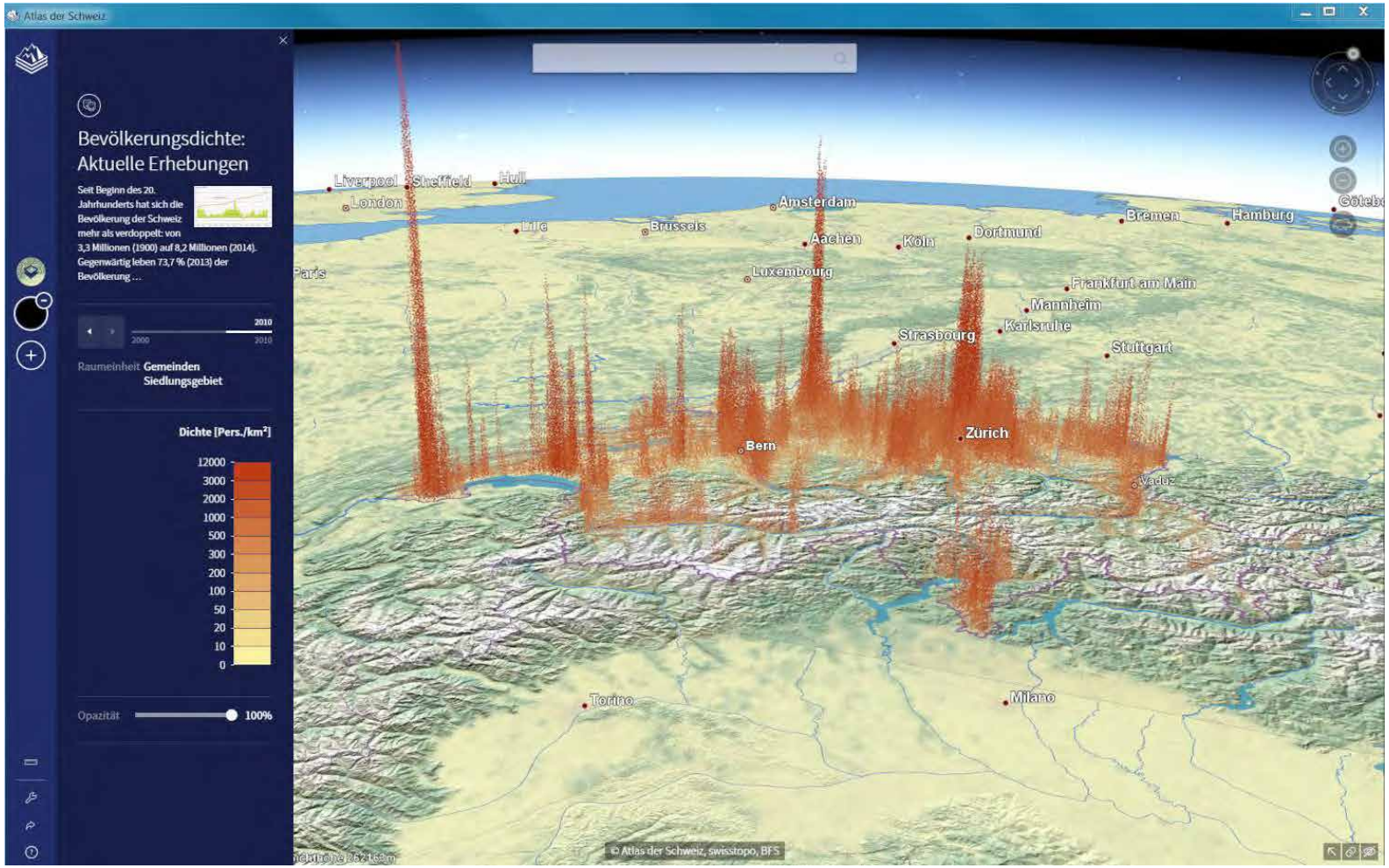
- Released digitally on CD-ROM (2000) and DVD (2004 and 2010).
- Available in four languages: German, French, Italian, and English.
- Featured both 2D and 3D topographic maps.
- Expanded functionality and thematic data.
- Added new topics such as Energy, Traffic, Communication, and Nature & Environment (650 new maps).



From printed maps to modern web technologies
Evolution of the Atlas of Switzerland

2016 - today
Atlas v4

- Based on 3D virtual globe.
- Using web technologies for user interface, running inside a Desktop app.
- Updated collection of existing map topics from previous versions.
- Online backend allows for continuous updates of maps (but not functionalities).
- No support for mobile devices.
- Requires download and installation, discouraging potential users.



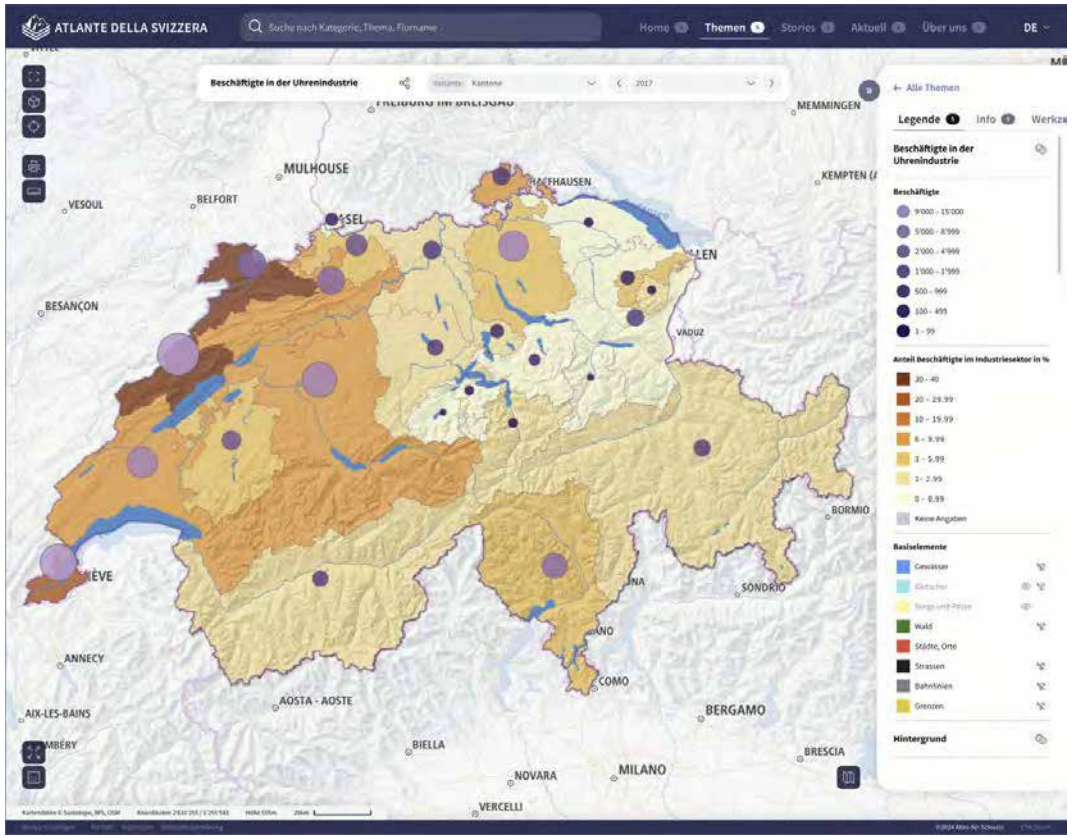
The new web-based Atlas of Switzerland
Goals

🙂 **Intuitive user interface**
to cover a wide range of user needs and use cases

📢 **Greater reach**
Accessible to all citizens on any device

🗺️ **Migrate over 400 thematic maps to the web**
Focus on maps in 2D-/3D-Flat and in the future also 3D globes

🚀 **Foundation for future innovation**
e.g. storytelling, animation and more sophisticated map types and symbology

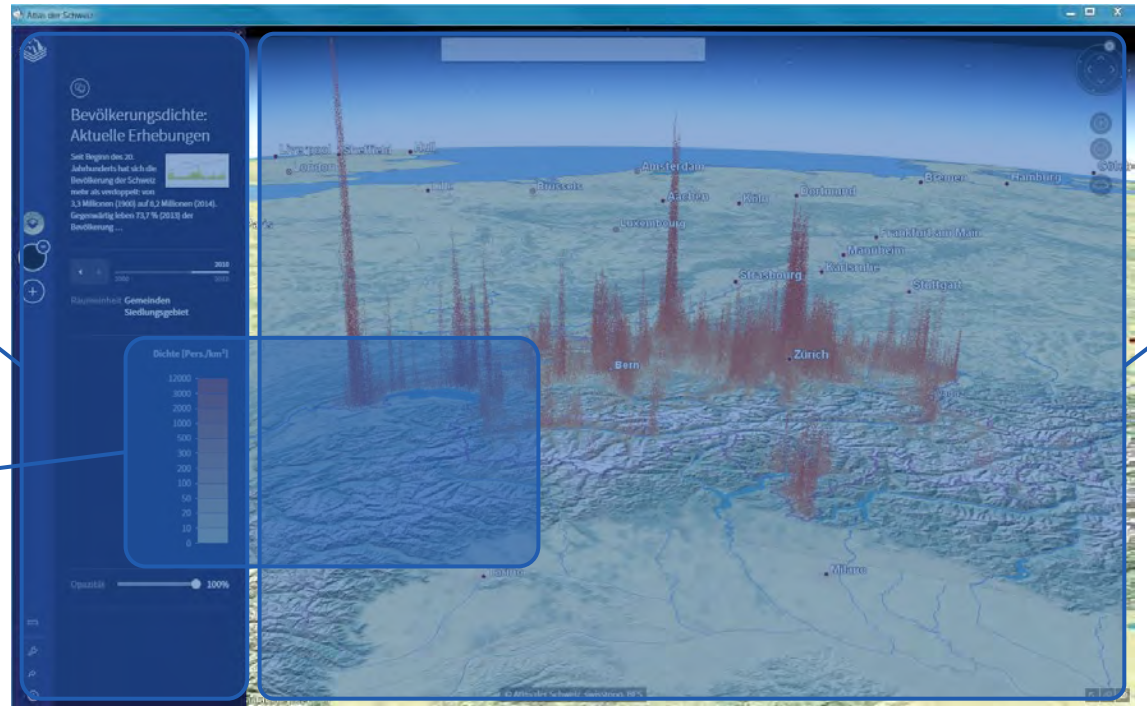


The new web-based Atlas of Switzerland
New development versus renovation

User Interface (Vue.js)
could be reused; but components are not responsive → ***Redesign and new development***

Libraries for Styling and Legends (JavaScript)
can be reused → ***modernisation (TypeScript)***

Desktop-Application AoS v4



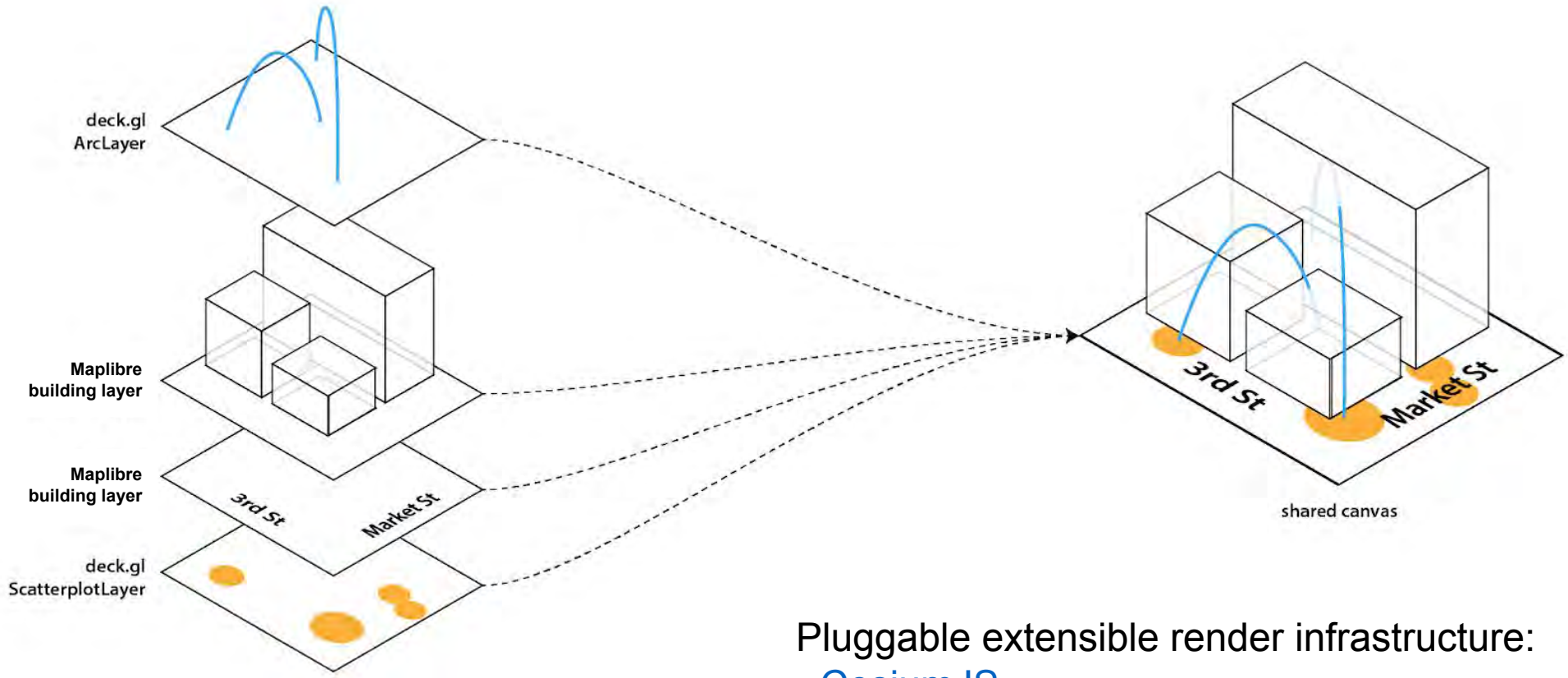
Map Rendering Engine (osgEarth)
is not web-compatible and has to be replaced → ***Evaluation / PoC***

Editorial system + Backend / Database

can remain in operation
→ **ongoing development and renovation**

The new render engine
Interplay between Maplibre and Deck.gl (or other renderers)

Maplibre and Deck.gl can be “interleaved”, i.e. Deck.gl layers can be placed “under” a certain layer of the vector base map. Example: Choropleth maps must have polygons displayed below the base map labels.



Source: https://deck.gl/docs/get-started/using-with-map#interleaved

Pluggable extensible render infrastructure:
- CesiumJS
- qgis-js (web assembly)

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UX / UI Design Process

Development of the new user interface
Design process

Development of the new user interface
Design process - Personas

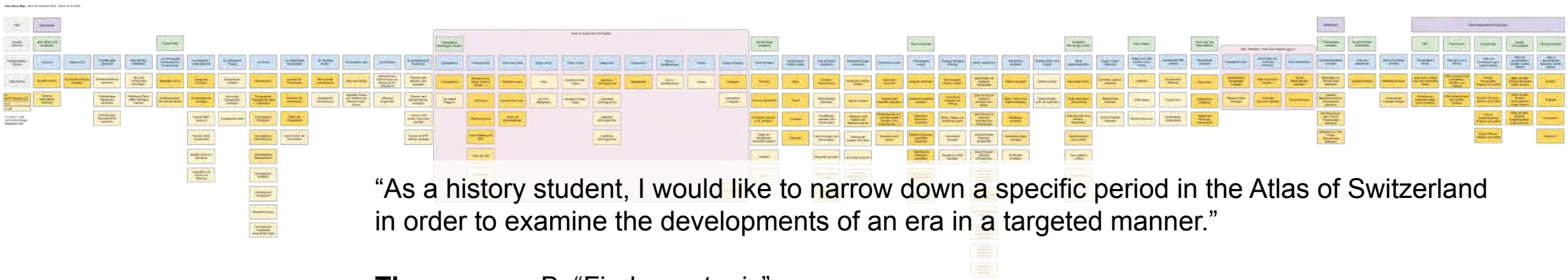
with Zeix

Personas & Use Cases → **UX Prototype** → **User Testing** → **UI Design**

Development of the new user interface
Design process - Use Cases and User Story Map

with Zeix

Personas & Use Cases → **UX Prototype** → **User Testing** → **UI Design**



“As a history student, I would like to narrow down a specific period in the Atlas of Switzerland in order to examine the developments of an era in a targeted manner.”

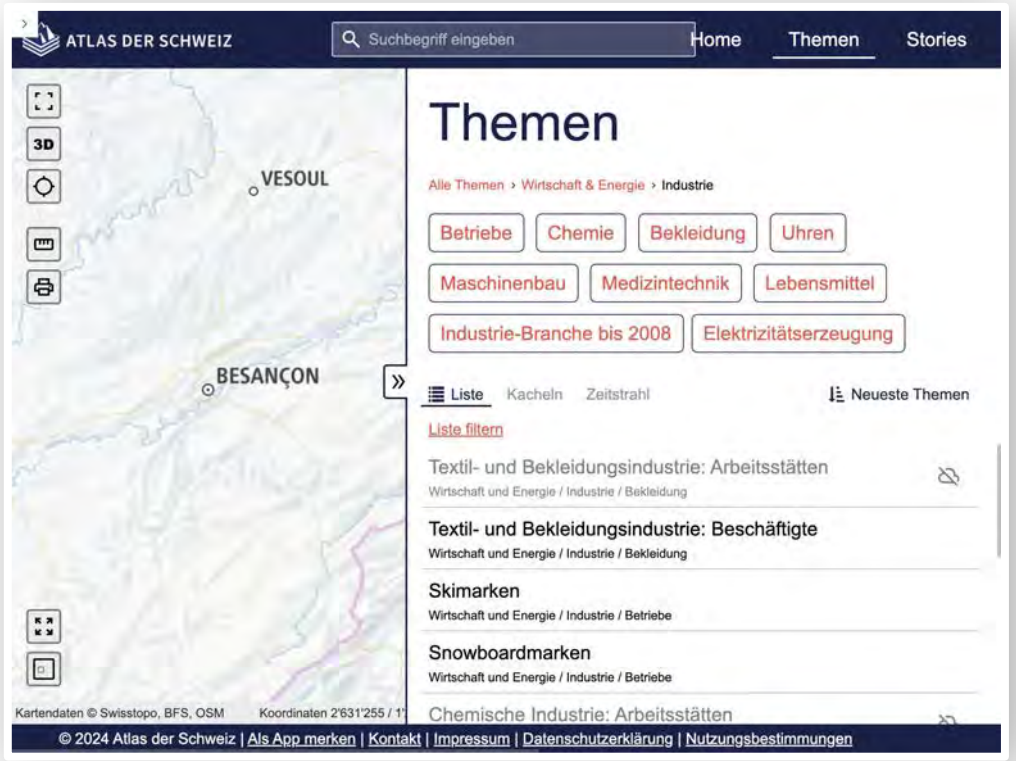
Themes → z.B. “Find map topic”
Epics → z.B. “Find map topic via search”, “Find map topic via time line”
User Stories → z.B. “Quick Search”, “Advanced Search”, “Define temporal limits”

Prioritization by “Minimum Viable Product (MVP)”, “medium-term” and “later”

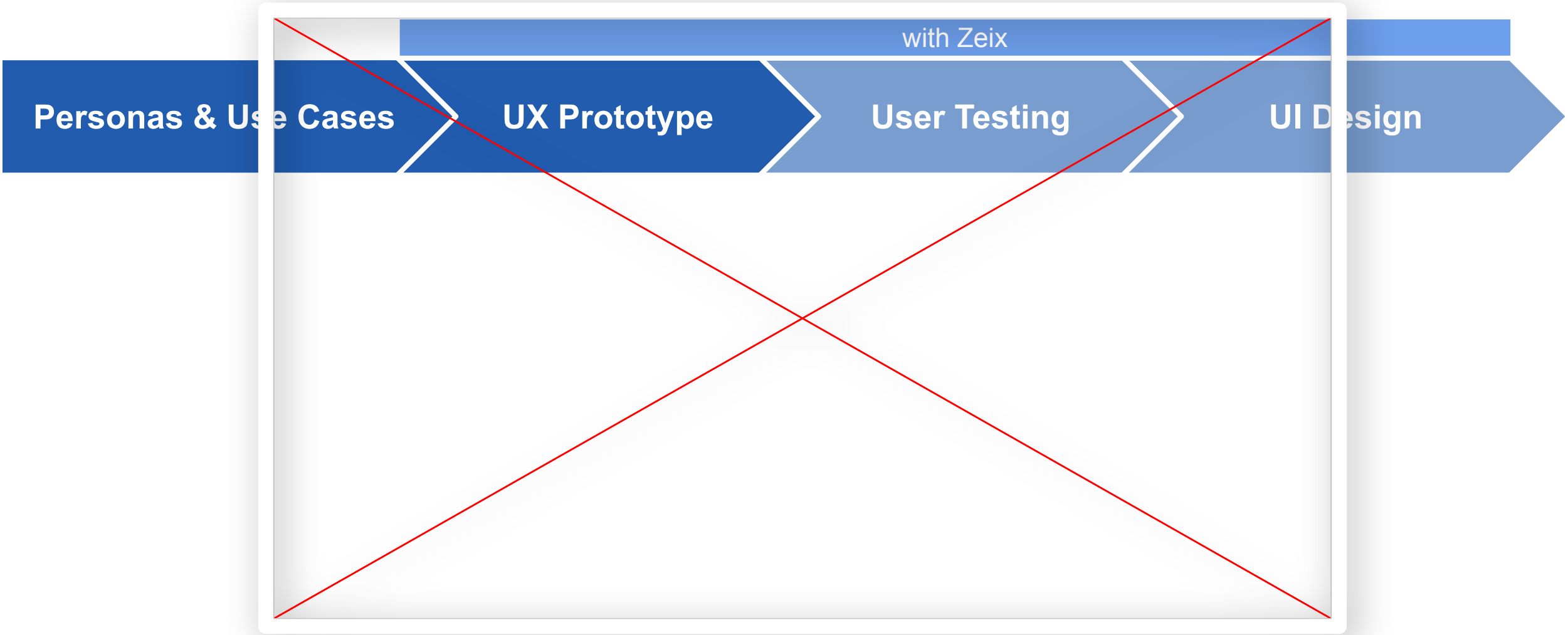
Development of the new user interface
Design process - Click prototype

with Zeix

Personas & Use Cases → **UX Prototype** → **User Testing** → **UI Design**



Development of the new user interface
Design process - Click prototype



Development of the new user interface
Design process - Hypothesis testing

with Zeix

Personas & Use Cases → **UX Prototype** → **User Testing** → **UI Design**

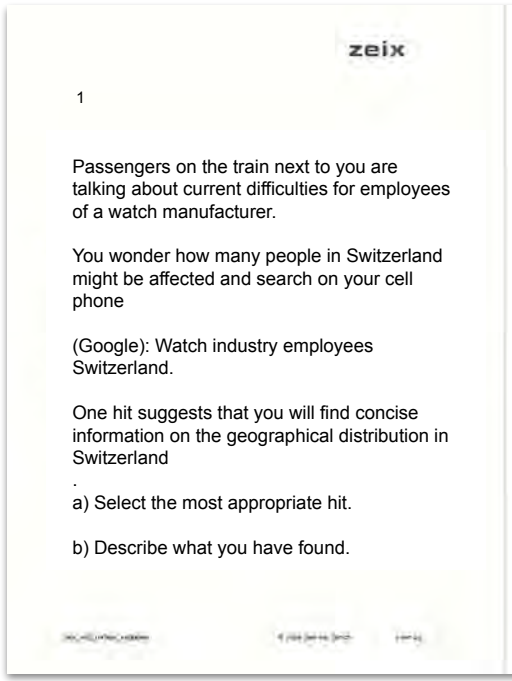
	A	B	C
1	ID	Hypothese	Gerät
2	H1	TP, die direkt auf einer Karte landet (deep link von Google), versteht den Aufbau Karte, Legende, Themadetail.	Mobile
3	H2	TP kann auf die Startseite navigieren.	Mobile
4	H3	TP versteht die Hauptinhalte des AdS in kurzer Zeit.	Mobile
5	H4	TP findet mit Hilfe der allgemeinen Suche, Themensuche/-filter zu einem bestimmten Thema.	Mobil
6	H5	TP findet (mind.) eine passende Einstiegsmöglichkeit, um zu einem (vorgegebenen) Thema zu finden.	Desktop (Start auf Startseite)
7	H6	TP versteht bei 'Themen' die Funktionsweise von Suche und Filter, oder bei der allgemeinen Suche die Gliederung der Trefferanzeige.	Desktop
8	H7	TP findet Detailseite zu einem Thema.	Desktop
9	H8	TP erkundet problemlos die angezeigten Inhalte und Funktionen eines gewählten Themas (Tab-Navi, Blättern, Favoriten, Quellenangaben).	Desktop
10	H9	TP findet gesetzte Favoriten zielgerichtet wieder.	Desktop
11	H10	TP versteht die Legende und die darin enthaltenen Bereiche und Funktionalitäten.	Desktop
12	H11	TP versteht, dass auf ein Kartenelement geklickt werden kann, um Informationen dazu zu erfahren.	Desktop
13	H12	TP versteht, dass es neue und "alte" Themen gibt und dass die alten nur nach Herunterladen eines Programms verfügbar sind.	Desktop
14	H13	TP findet die Tools und versteht deren Funktionalitäten anhand von Symbol und Label.	Desktop
15	H14	TP versteht den Unterschied zwischen '... überlagern' und '... vergleichen'.	Desktop
16	H15	TP nutzt '... überlagern' korrekt und versteht die Funktionsweise.	Desktop
17	H16	TP nutzt '... vergleichen' korrekt und versteht die Funktionsweise.	Desktop
18	H17	TP kann den Hintergrund wechseln.	Desktop
19	H18	TP findet die Sharing-Funktionen und erklärt korrekt, was beim Sharen passie	Nachinterview
20	H19	TP beurteilt den neuen AdS Web grundsätzlich positiv und fügt ggf. passende Wünsche an.	Nachinterview
21	H20	TP beschreibt die Idee hinter dem AdS korrekt und erwähnt, dass der Atlas zu spezifischen Themen Karten und entsprechende Beschriebe liefert.	Nachinterview

1 hour per user, incl. pre and post interview
10 tasks, with think aloud, video recordings and protocols

Development of the new user interface
Design process - Hypothesis testing - Tasks

with Zeix

Personas & Use Cases → **UX Prototype** → **User Testing** → **UI Design**


zeix

1

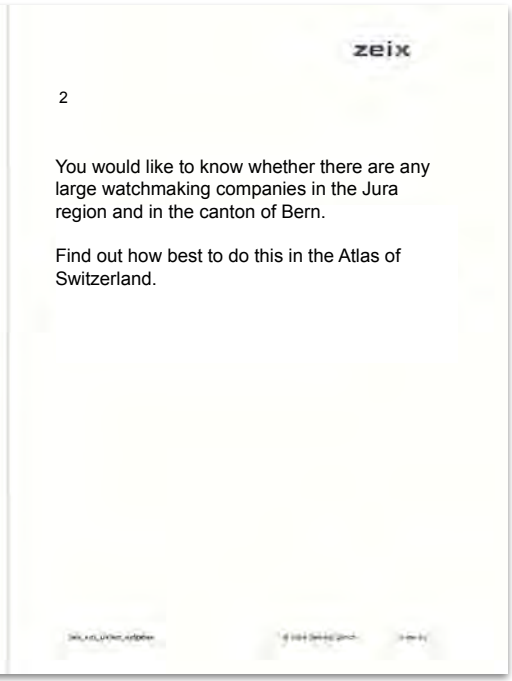
Passengers on the train next to you are talking about current difficulties for employees of a watch manufacturer.

You wonder how many people in Switzerland might be affected and search on your cell phone

(Google): Watch industry employees Switzerland.

One hit suggests that you will find concise information on the geographical distribution in Switzerland
.
a) Select the most appropriate hit.

b) Describe what you have found.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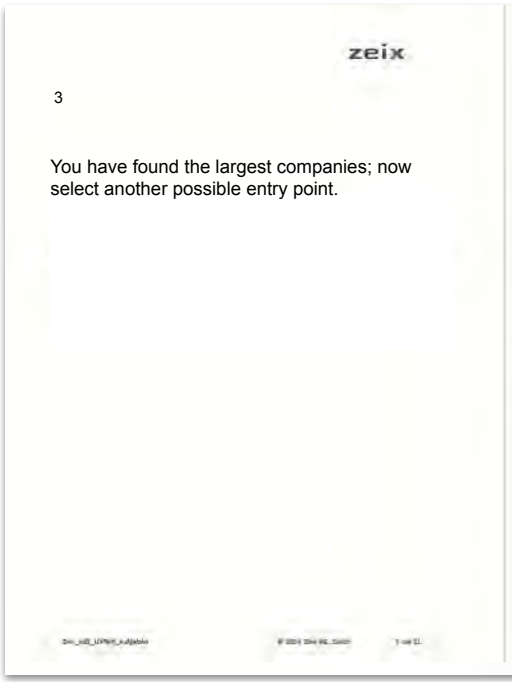
2

You would like to know whether there are any large watchmaking companies in the Jura region and in the canton of Bern.

Find out how best to do this in the Atlas of Switzerland.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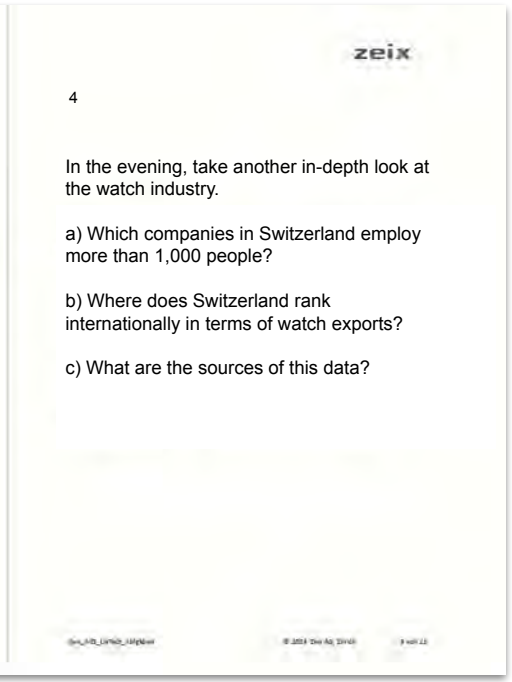
3

You have found the largest companies; now select another possible entry point.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4

In the evening, take another in-depth look at the watch industry.

a) Which companies in Switzerland employ more than 1,000 people?

b) Where does Switzerland rank internationally in terms of watch exports?

c) What are the sources of this data?

Testing on Mobile | Testing on Desktop

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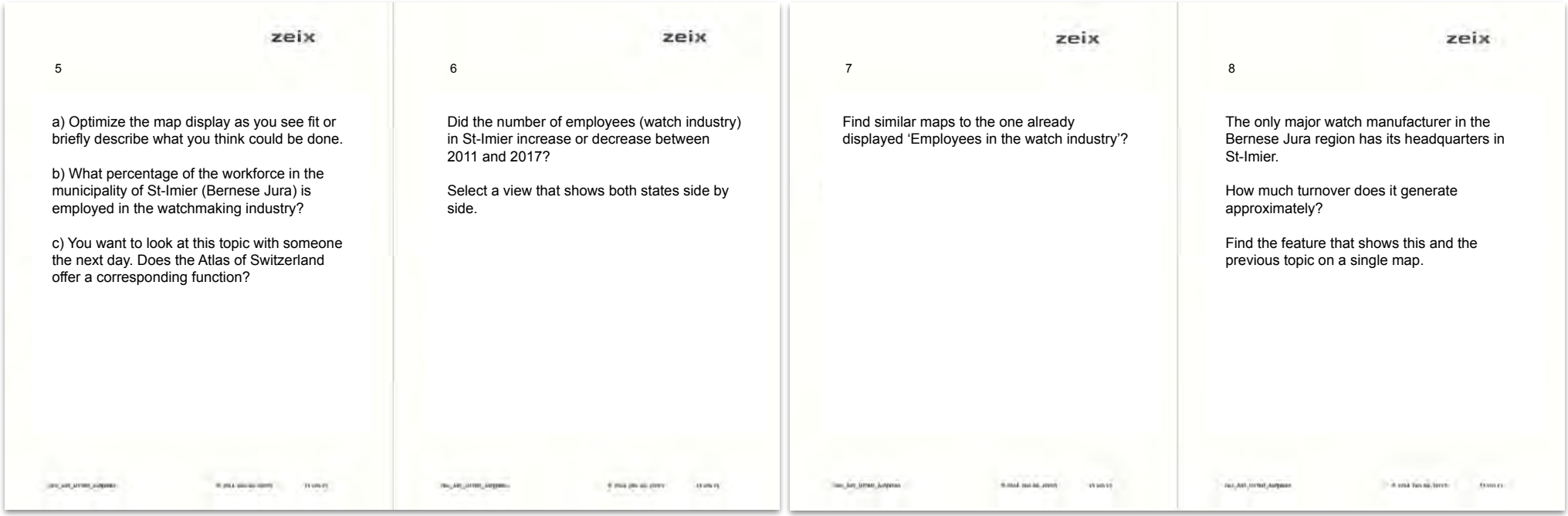
Development of the new user interface
Design process - Hypothesis testing - Tasks

with Zeix

Personas & Use Cases → **UX Prototype** → **User Testing** → **UI Design**



zeix

5

a) Optimize the map display as you see fit or briefly describe what you think could be done.

b) What percentage of the workforce in the municipality of St-Imier (Bernese Jura) is employed in the watchmaking industry?

c) You want to look at this topic with someone the next day. Does the Atlas of Switzerland offer a corresponding function?

zeix

6

Did the number of employees (watch industry) in St-Imier increase or decrease between 2011 and 2017?

Select a view that shows both states side by side.

zeix

7

Find similar maps to the one already displayed ‘Employees in the watch industry’?

zeix

8

The only major watch manufacturer in the Bernese Jura region has its headquarters in St-Imier.

How much turnover does it generate approximately?

Find the feature that shows this and the previous topic on a single map.

Testing on Desktop

Development of the new user interface
Design process - Hypothesis testing - Tasks

with Zeix

Personas & Use Cases → **UX Prototype** → **User Testing** → **UI Design**

Testing on Desktop

Development of the new user interface
Design process - New insight from testing

- Concepts from “main stream” products (Google Maps, map.geo.admin.ch) are easily understood
- Drill-down filtering in topic hierarchy and bread-crumb navigation works well
- Double folding concept of side bar (text side by side with legend) was abandoned (people didn’t understand the concept) and was replaced with tabs
- Map title and selection of map variant, time and spatial reference units was moved from side-panel to separate “cardbar”-widget (esp. important for map comparisons)
- Map comparison and overlay can be a challenge for users (but can be handled)
- Multiple search widgets are confusing to users (second search widget for keyword search was abandoned)

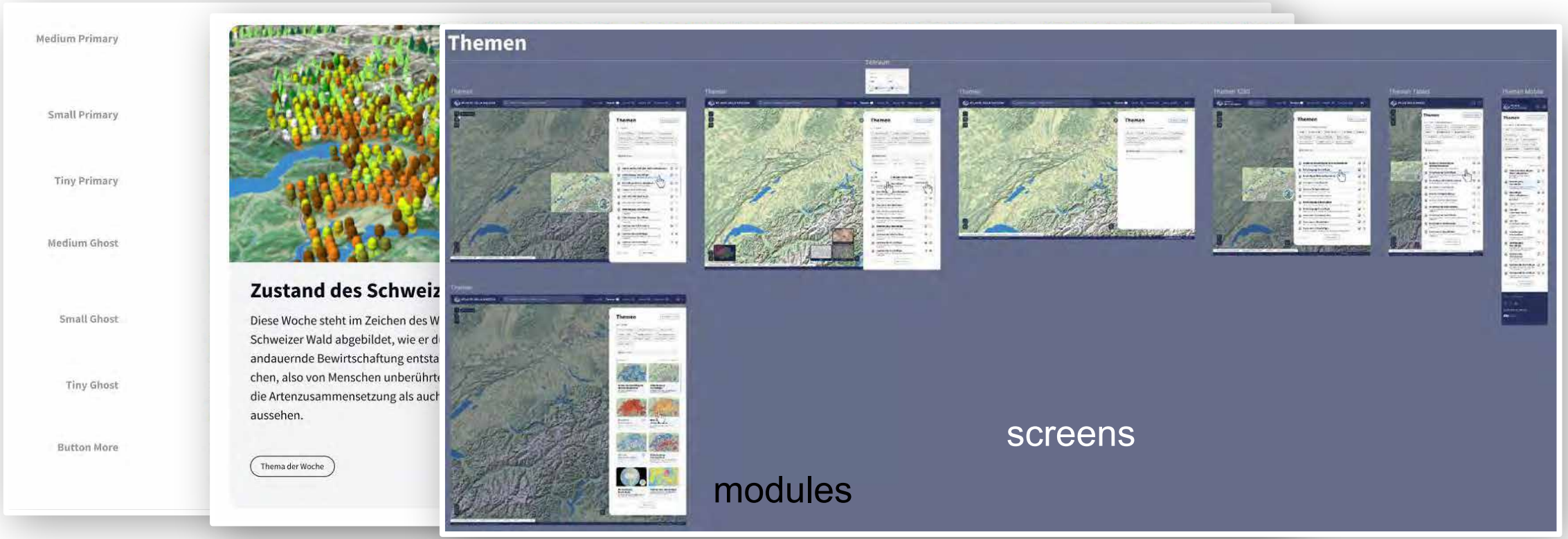
Development of the new user interface
Design process - New insight from testing

- Related topics in click prototype was “too hidden” (had to be moved in the Info tab)
- Some general tools like printing and measuring had to be moved from the side panel to the main map panel
- The young generation is intimidated by too much text in our info panel: not willing to read more than 2-3 paragraphs

Development of the new user interface
Design process

with Zeix

Personas & Use Cases → **UX Prototype** → **User Testing** → **UI Design**



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Frontend architecture

Tooling for the frontend
Focus on performance, SEO, and accessibility

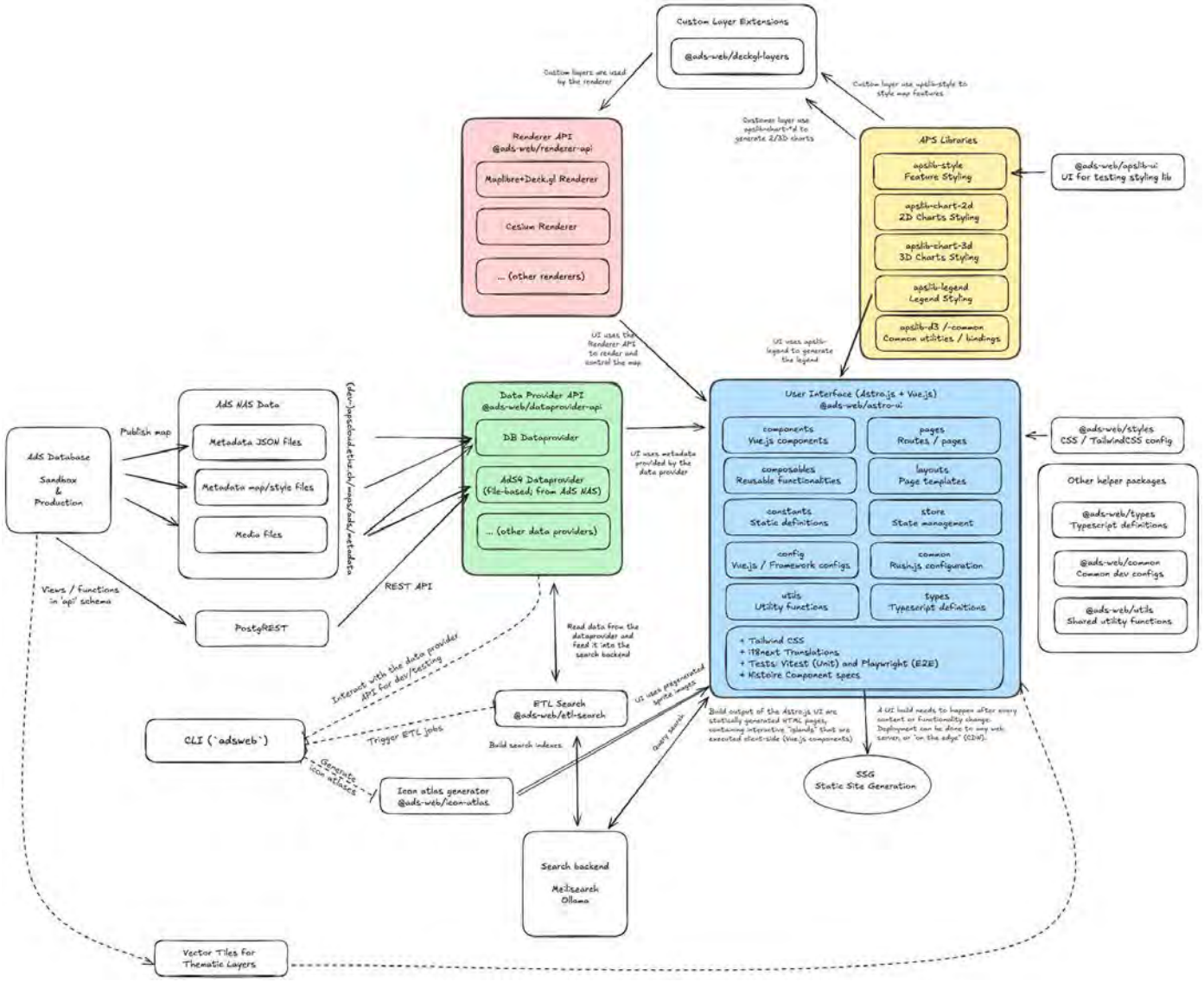
Web framework with “static site generator” functionality – allows pre-generating all pages as HTML files with minimal JavaScript.

Vue.js - A widely used JavaScript framework for building interactive web applications and websites.

CSS framework with utility classes; popular and suitable for developing scalable, responsive web frontends.

rush.js - framework for breaking up large applications into components, handling their dependencies, incremental builds and packaging

Development of the new user interface
Technical Architecture



Frontend architecture in a nutshell:

- **Separation of concerns**:
  Rendering, data access and UI logic are decoupled. This simplifies maintenance and improves flexibility.
- Additional **renderers** (e.g. Cesium) could be added without a major refactor.
- The **APSLib packages** (feature styling, 2D charts generation) are taken over from the AoS4 and integrated seamlessly
- All frontend packages are managed in a **Rush.js monorepo**, ensuring modularity and consistency

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Demo: Current state of work

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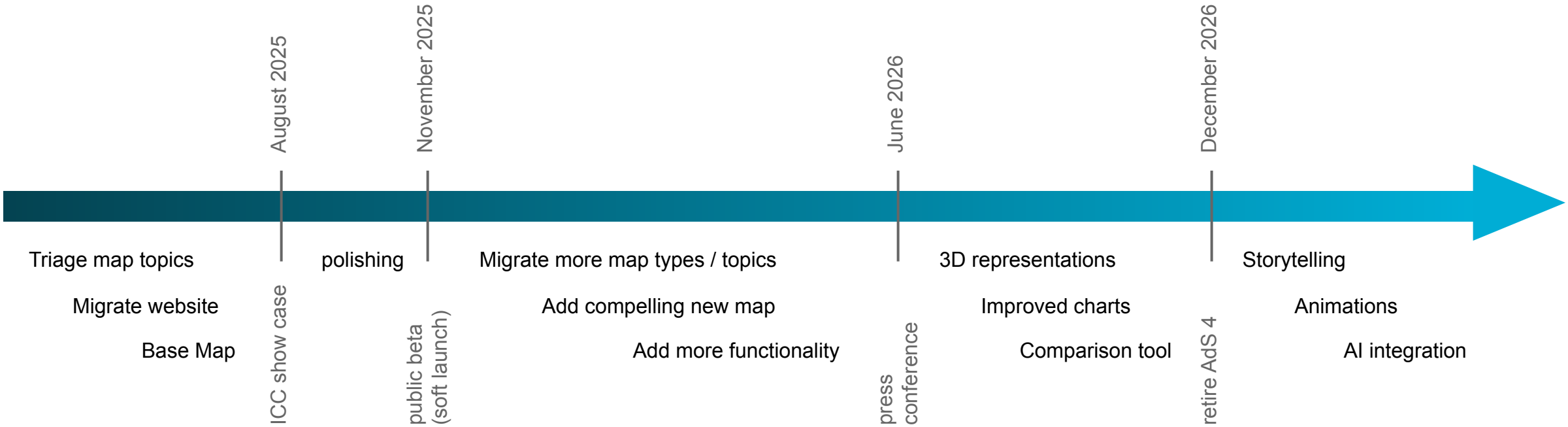
Next steps

AoS Future
Coming Milestones



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Thank you:

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swisstopo, Federal Statistics Office and many other OpenData providers!