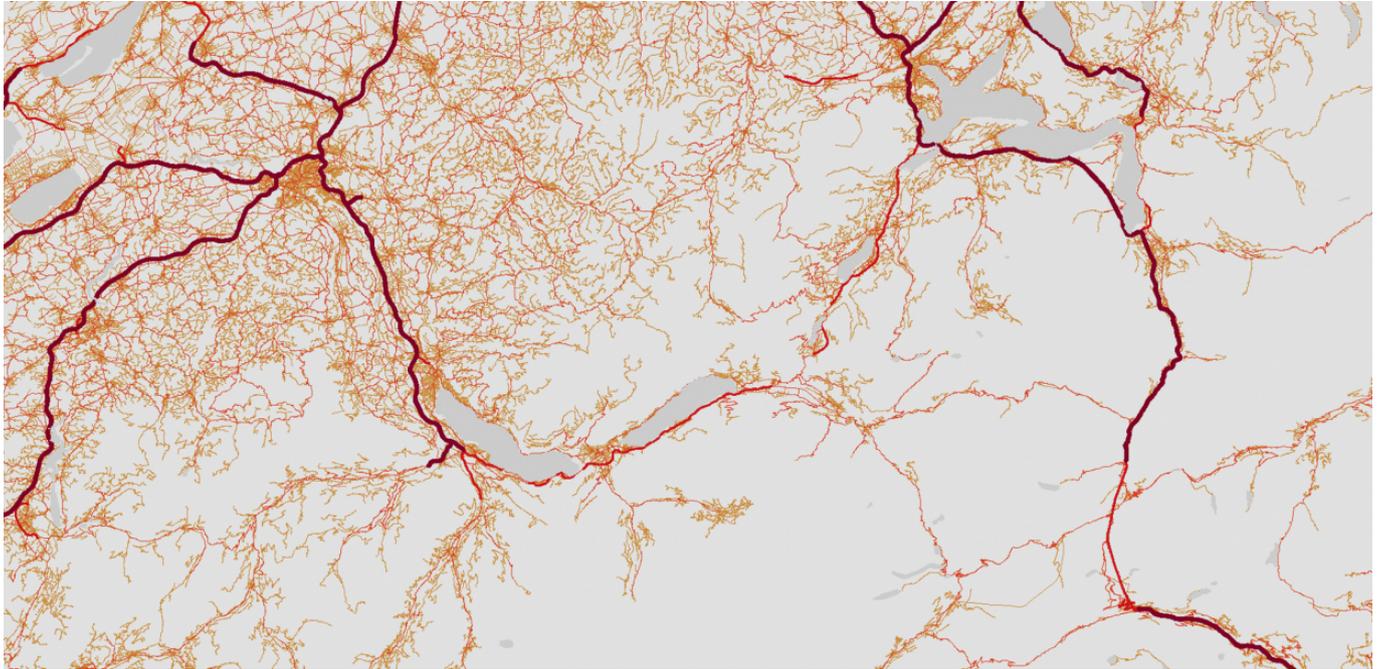


# Swiss Transport Model 2017: Zone Structure and Transportation Networks



**The Swiss Federal Office for Spatial Development (ARE) is developing a new national model for passenger transport. The model enables planners to assess traffic dynamics such as distribution of trips and traffic flows and to anticipate the impact of planning measures. EBP provided the base for this model by establishing transportation networks and traffic zones.**

## Transport Models as Tools for Transport Planning

Transport models are used in transport planning to represent the complex relationships between residential, environmental, economic, societal and infrastructure factors, and to enable reliable assessments of future changes. Various cantonal and regional models are typically referenced today in Switzerland, depending both on the tasks at hand and the stakeholders involved. The National Model for Passenger Transport (NMPT) establishes a basis for all transport planning that takes place at a federal level.

## Establishing the Basis for Transportation Networks and Traffic Zones

EBP was commissioned to help the ARE draft the new NMPT 2017. The focus of the assignment was on creating a technical basis in the areas of transportation networks and traffic zones so as to enable a reliable base for modelling passenger transport at a national level. EBP succeeded in integrating various public transport networks and their corresponding service offers. We also subjected the TomTom navigation network to a quality

## Client

Swiss Federal Office for Spatial Development (ARE), Basic Data

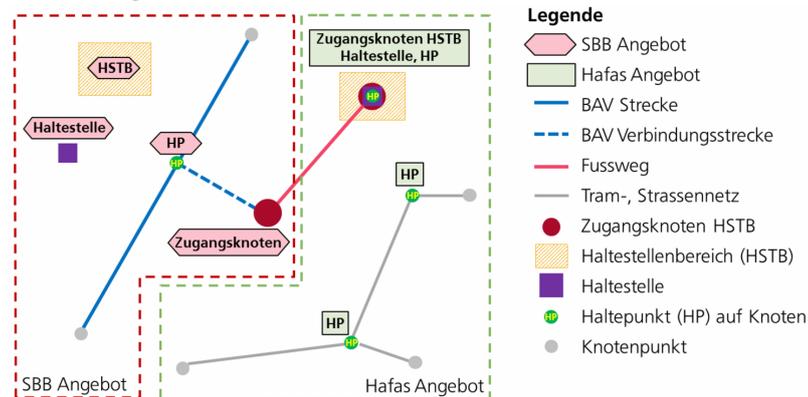
## Facts

Period	2016 - 2017
Project Country	Switzerland
Number of zones	7,970
Number of routes in complete road network	1,566,092
Number of public transportation routes	2,156

validation procedure before preparing it for transport modeling and equipping it with additional attributes. Parallel to these efforts, we redrafted the traffic zone structure with an eye to ensuring that it could be mapped without any loss of detail to the existing, less refined zone structure.

### Public Transportation: Integrated and Cross-border

Our project contribution provides an integrated model for public transport services based on data available in 2015. In addition to offering a representation of the railway services provided by SBB in Switzerland and abroad, it also includes all of the city and regional public transport services available in the Hacon Scheduling Information System (HAFAS). EBP represented the links between the various public transport services by adding the corresponding network elements to the network model and verified the scheduling information for these services. As a supplement, we included a projection of the SBB prognosis schedule extending to the year 2030. We used the railway network made available by the Federal Office of Transport (BAV) to represent the basic infrastructure and extended it accordingly so as to correctly route the railway services. We also represented the available bus routes and scheduling.



Legend: Resulting road network, color-coded according to type (red: autobahn, orange: highway, green: main artery, gray: remaining streets)

### Road Network: Swiss-wide, Validated, Expanded and Routable

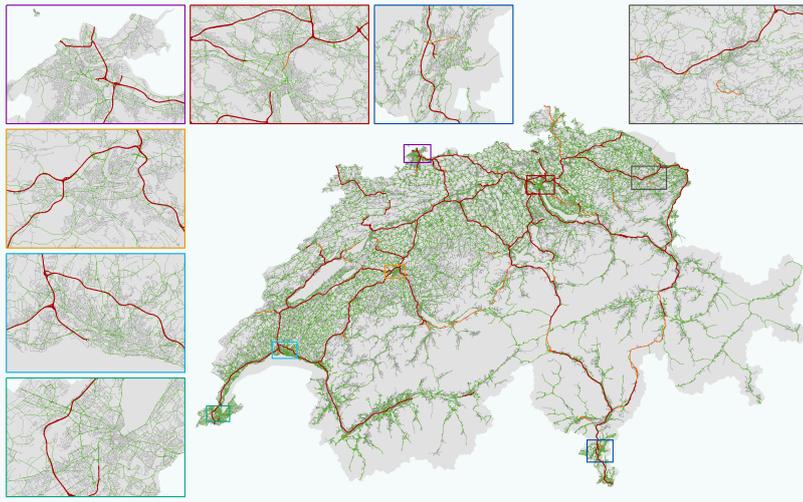
The aim of preparing the road network based on data available in 2017 was to provide a routable network for the transportation model. To do this, EBP defined transport systems, route types and other variables, determined the number of existing traffic lanes and roadway capacities, ascertained model speeds with the use of TomTom speed profile data and specified turn restrictions. By way of wrapping up this task, we implemented a network thinning approach based on the relevant topographical relationships. This has essentially provided the ARE with a Swiss-wide, validated and routable road network for future modeling tasks in the new NMPT.

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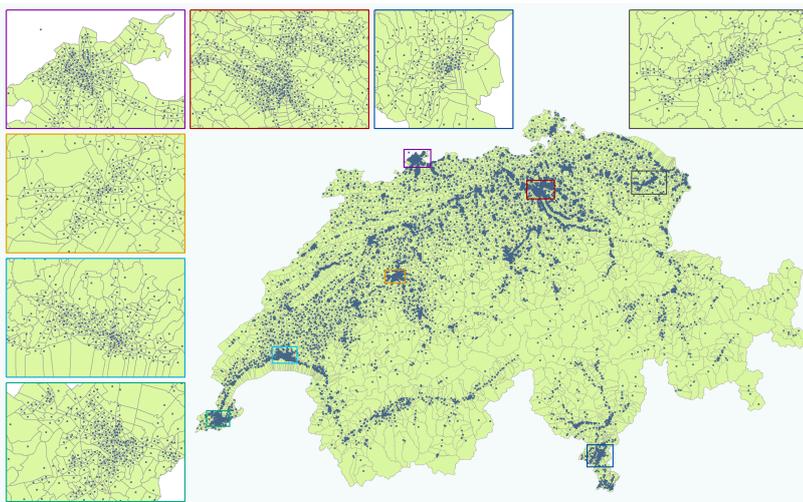
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Legend: Resulting road network, color-coded according to type (red: autobahn, orange: highway, green: main artery, gray: remaining streets)

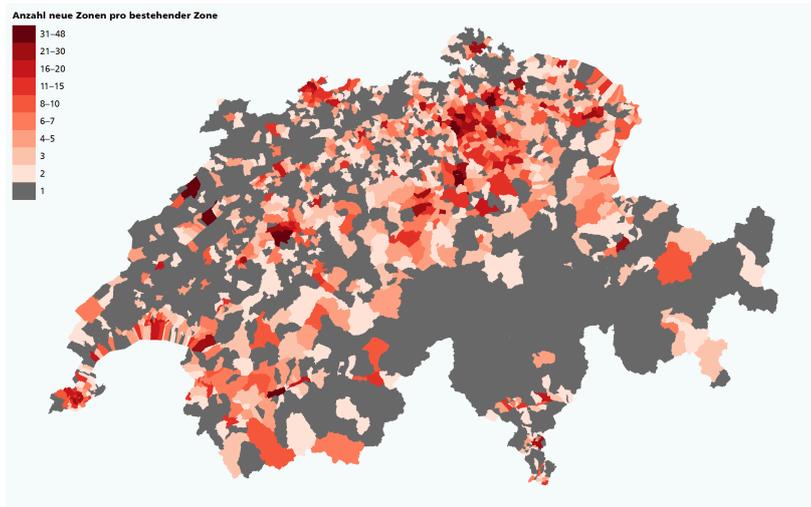
### Zone Structure Based on GIS

Compared to previous models, the new model offers a much more refined zone structure. Moreover, EBP made use of extensive data (infrastructure networks, water borders, construction zones, population, jobs) to break down the previous 3,000 transportation zones to around 8,000 zones. We also used FME and ArcPy scripts (Esri ArcGIS) to develop a procedure that enables iteratively optimized aggregations based on automatically generated and very detailed starting zones. The quality of the procedure was manually enhanced and validated in a final step. We developed rules for manual processing that effectively ensure a harmonized procedure across Switzerland. We also represented particularly traffic-intensive locations such as airports and shopping centers as separate zones.



Legend: New NMPT zones and population-weighted zone centers

We included the verified traffic zones in the public transport and road network models. Finally, we checked the network coherence and the validity of the models based on skim matrices.



Legend: In the new NMPT, urban areas in particular are represented by significantly refined zones.