

# CentropeSTATISTICS – Working Interactively with Cross-Border Statistic Data

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## 1 ABSTRACT

The Centrope region is situated at the mutual borders of Austria, the Czech Republic, Hungary, and Slovakia. CentropeMAP is an online geoportal for spatial planning data from this region. It went online in 2005 and was extended by the cross-border statistics database CentropeSTATISTICS in 2010. CentropeSTATISTICS allows its users to create thematic maps and various types of charts on the fly. There is a basic mode with pre-defined maps as well as an expert mode where a lot of layout and classification settings can be defined by the user. The statistics database is continuously expanded in close co-operation with the statistical offices of Hungary, Slovakia, the Czech Republic, Vienna, Lower Austria and Burgenland.

## 2 INTRODUCTION

### 2.1 About Centrope

The Central European region Centrope is a cross-border region situated along the mutual boundaries of Austria, the Czech Republic, Hungary, and Slovakia. The Centrope region is not naturally grown – a quarter of a century ago it was still divided by the Iron Curtain –, it is a political and economical construction to help all parts of the region to overcome the unfavourable development during the period of the Cold War when these regions were practically cut off at their edges. So it might not be a surprise that the term “Centrope” is still unknown in common everyday life although a lot of projects and initiatives is running under the patronage of Centrope following the motto “An image of tomorrow as a task for today”.<sup>1</sup> To enhance the popularity of Centrope an initiative called “MyCentrope” was installed. It collects news and events from the region on its website mycentrope.com and also places advertisements in regional magazines to intensify cultural exchange between the parts of the Centrope region.

### 2.2 About CentropeMAP

CentropeMAP is a geoportal collecting web map services (WMS) from all parts of the Centrope Region. Its thematic emphasis is on datasets that are of interest for spatial planning and similar professions, comprising multiple data layers from the fields of biota, boundaries, elevation, imagery/base maps, inland waters, planning/cadastre, structure, and transportation. All data is displayed in a cross-border map viewer in a unified map projection although the single datasets are retrieved from distributed servers located all across Centrope.

### 2.3 About CentropeSTATISTICS

Planners do not need only maps for their work, they also need statistic data to analyse a region. Therefore, the goal of CentropeSTATISTICS is to directly add statistic data to the CentropeMAP geoportal by means of thematic maps. The statistics extension was launched in the year 2010 and features a basic mode with ready-made thematic maps as well as an expert mode: The CentropeSTATISTICS Basic Mode allows to create a couple of thematic maps which have been predefined by the CentropeMAP team. It is mainly for quick queries or for people who do not have much experience in creating thematic maps or charts from statistic tables. The CentropeSTATISTICS Expert Mode gives full access to the whole Centrope cross-border statistics database, you can download these data and set several options while creating your thematic map or chart. The expert mode is meant for planners, statisticians and other professionals who know how to create meaningful thematic maps and charts.

Planungsgemeinschaft Ost (PGO), the initiator of CentropeMAP and CentropeSTATISTICS, is closely working together with the statistical offices of Hungary, Slovakia, the Czech Republic, Vienna, Lower Austria and Burgenland to keep the high quality datasets at municipality level up to date. International

<sup>1</sup> <http://www.centrope.com/en/centrope-project/vision-2015> (as of 28 March 2012).

statistics workshops twice a year help to guide the further development of the cross-border statistics database containing mainly population, migration, and land use data.

## 2.4 The Centropemap Web

Centropemap is accessible via internet: <http://www.centropemap.org>. The Centropemap geoportal can be directly accessed at <http://map.centropemap.org>, and CentropeSTATISTICS can be started from Centropemap. All map layers and statistic tables are available without any limitation.

## 3 A CROSS-BORDER STATISTICS DATABASE WITH AN INTERACTIVE USER INTERFACE

### 3.1 Getting started

CentropeSTATISTICS starts with an overview of available data. All tables are hierarchically organised in a menu tree on the left side of the screen, details are shown on the right side (see fig. 1).

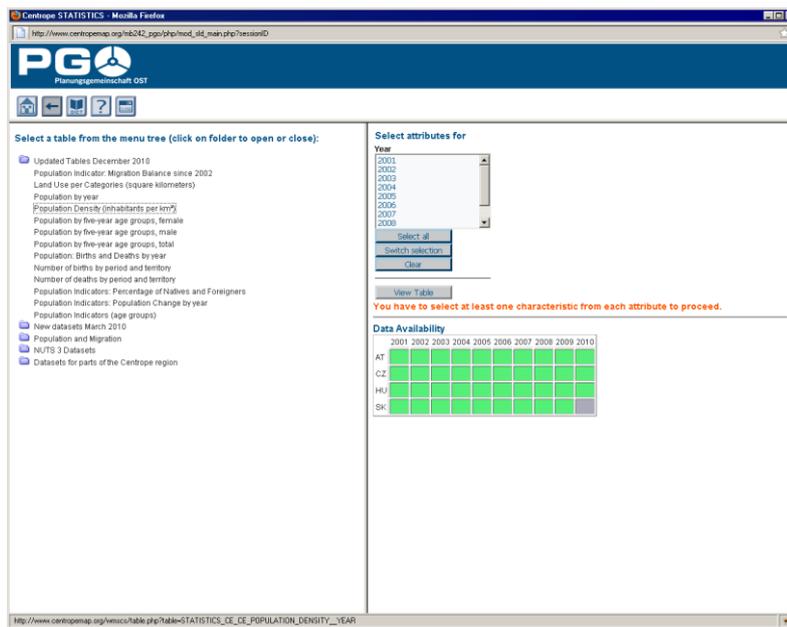


Fig. 1: Table overview.

In the next step, the table is shown (first 30 datasets only so that the download does not take too long). Here the viewer can download the data in CSV or Excel format to use the table locally. When downloading, metadata are automatically included in the download. Apart from simple data download, there are several other possibilities to interactively work with the statistic data provided by CentropeSTATISTICS.

### 3.2 Creating thematic maps

All table columns suitable for map creation have a “Create map” button on top. Hitting this button allows the user to select various options to design a choroplethic map which can then be used as overlay in Centropemap.

There are several statistical methods for class definition:

- equal interval: The numeric range of all classes has the same size;
- quantiles: The elements are evenly distributed so that each class contains the same number of elements;
- standard deviation: The class ranges are defined according to the standard deviation of the elements;
- equal area: The elements are distributed in a way that each class covers (approximately) the same area (sum of municipality areas in each class is equal);
- natural breaks (ArcView): The natural breaks algorithm minimises the variance within classes and maximises the variance between classes. This option produces an output similar to the algorithm used in ESRI’s ArcView GIS;

- natural breaks (Jenks): same as above but using the Jenks algorithm which produces slightly different results than the ArcView method;

If there is data with positive and negative values (e. g. population density increase/decrease) and a dichromatic colour ramp is used, special zero handling can be defined:

- no special zero handling: leave everything as it is;
- treat white as zero only: The class including zero is split into two classes, and a separate class having zero as only value is added. Note: The effective number of classes is higher by 2 than the preselected number of classes;
- use white for class incl. 0: preserve class definition, but shift the colour ramp so that white is used for the class including the zero value;
- no white in legend: preserve class definition, but build a colour ramp with no white class.

Of course all class values and all colours can be set manually if something different than the given options is required.

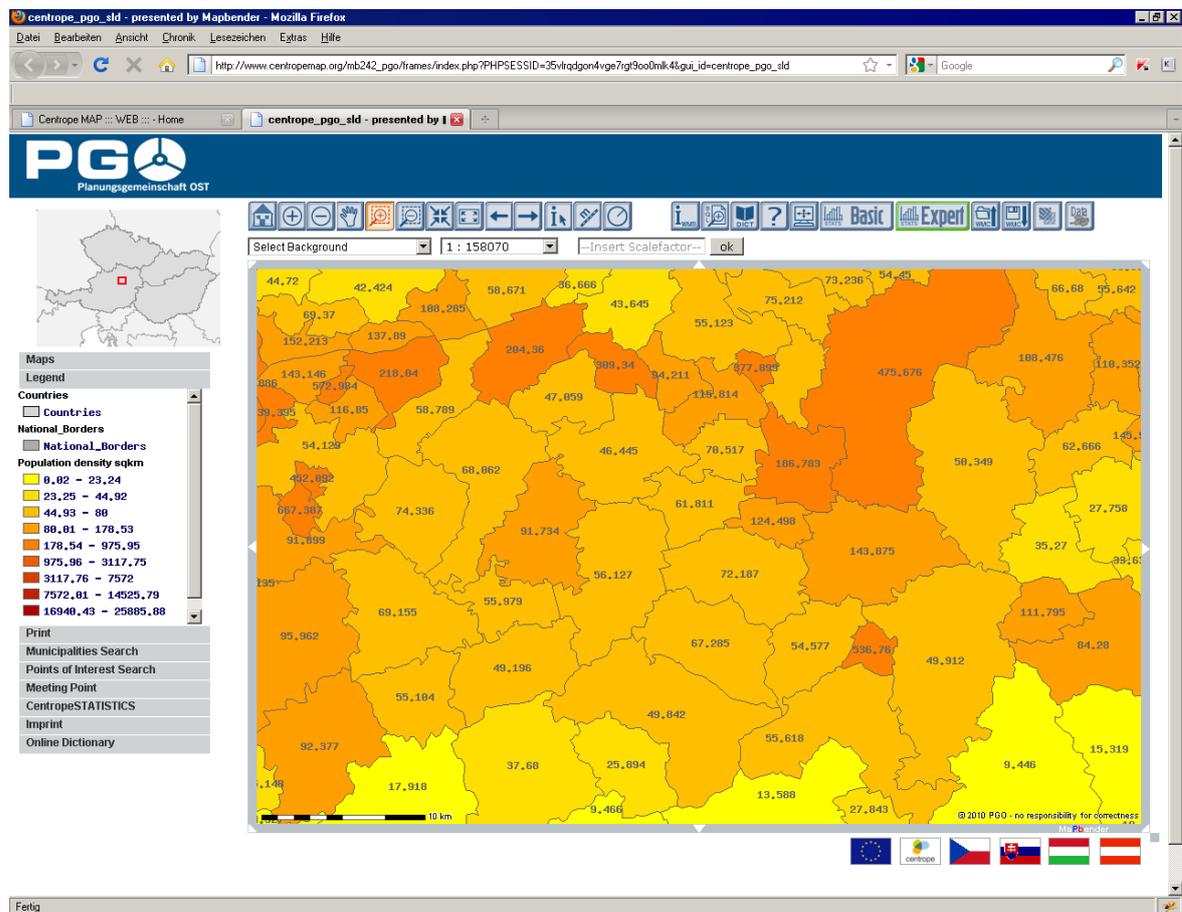


Fig. 2: Thematic map overlay with labels. To see the background layers, transparency can be applied to each theme.

### 3.3 Creating charts

Like maps, also charts can be created from the table view. In a similar manner also the “Create chart” and/or “Create pie chart” buttons are placed only on top of columns where this option is meaningful. Like with thematic maps, also with charts nearly all design options are configurable and can instantly be applied to the chart which is realised as graphic output (image file).

Depending on the contents, charts can be bar charts (see fig. 3) or pie charts. Bar charts can also be converted into point and/or line charts. Bar, line, and point charts always show a time series of the selected attribute – it is one of the main goals of CentropeSTATISTICS to collect data not only by theme, but also by year to make developments over time visible. The most important datasets are updated every year, others will be made available in decade steps (2011, 2001, 1991, ... – the years of the main census).

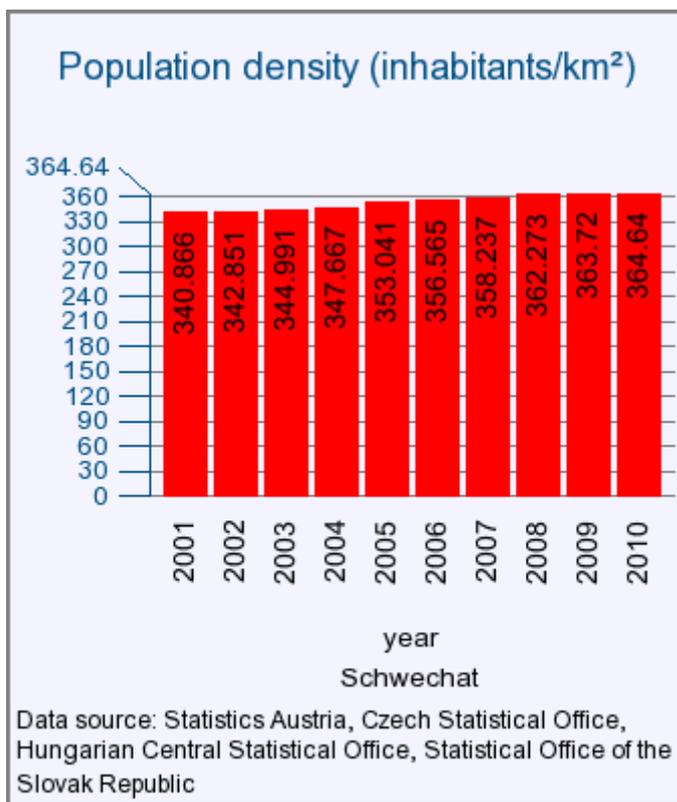


Fig 3: Example bar chart: Population density of Schwechat, Lower Austria, 2001-2010.

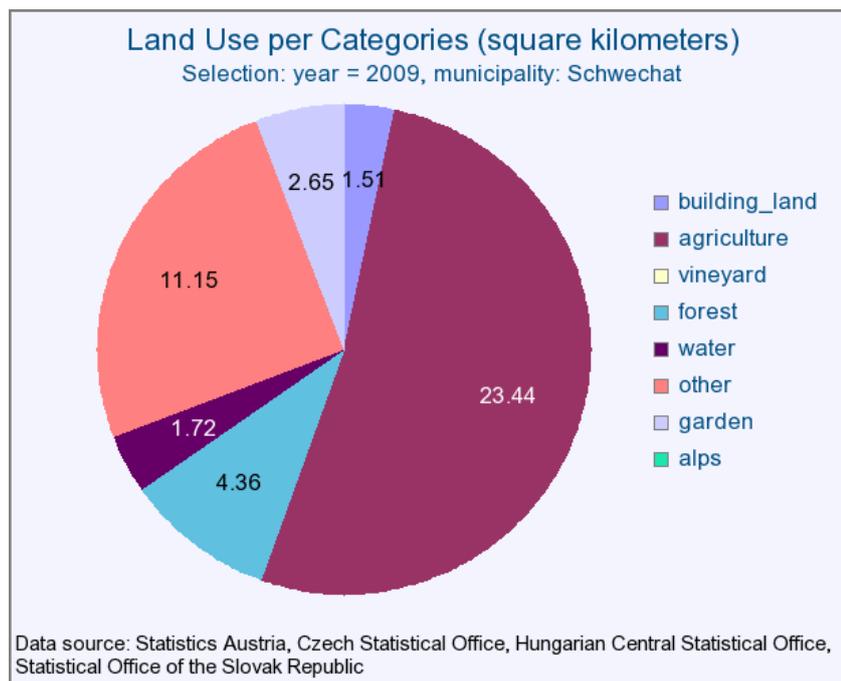


Fig 4: Example pie chart: Land use per categories, Schwechat, 2009.

### 3.4 Creating custom tables

Since 2011 it is also possible to create custom tables. The user can collect values from different tables and calculate new values on their own. All data in a custom table is treated in terms of geographic intersection so that calculations are done for any area where sufficient data is available. For example, from population time series and area values.

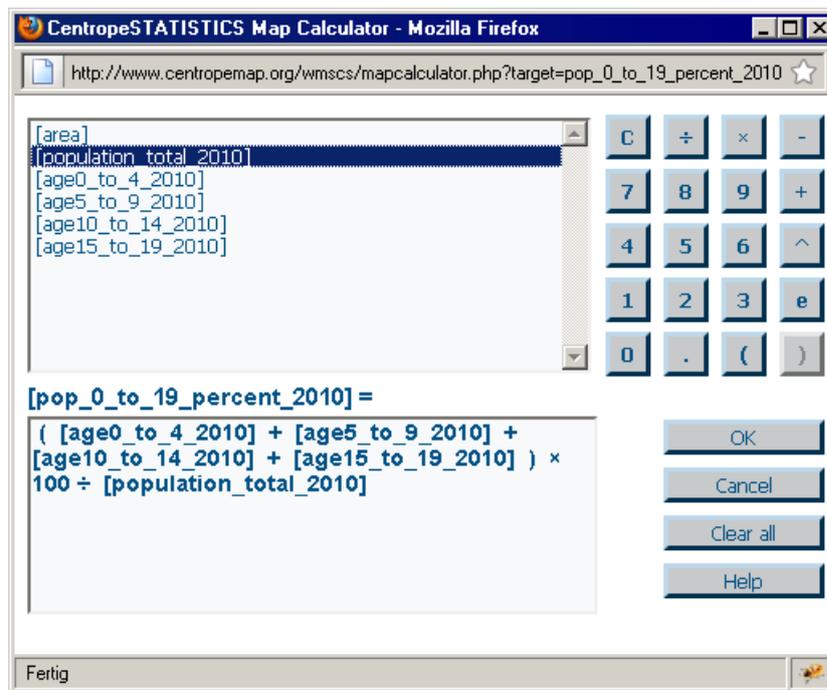


Fig 4: CentropeSTATISTICS map calculator.

The map calculator allows to combine all available attributes with basic arithmetic operations (addition, subtraction, multiplication, division, exponentiation). The results are put into a separate column which can also serve as input for thematic map or chart creation.

#### 4 FUTURE PERSPECTIVES AND OUTLOOK

CentropeMAP and CentropeSTATISTICS are growing – slowly, but steadily. Discussions on the extension of the theme range of the CentropeSTATISTICS cross-border statistics database are an issue at each statistics workshop. All incoming datasets have to be checked on their compatibility and comparability with existing data. This is extremely important for statistical data because it has to be verified that datasets from different countries were generated in the same way before they are put together in one table. This is no big deal with population data, but, for example, when dealing with employment or tourism data, some problems arise: Such data are often collected differently – by different institutions, for different dates, following different goals – in each country of the Centrope region, so there has hardly been any possibility to compare data for the whole region. This situation may improve in the future as the statistic offices are more and more following guidelines of the European statistical office (Eurostat). Data delivery from each EU country to Eurostat has already been running for many years; however, these datasets are not on municipality level but on NUTS 3 or NUTS 2 level<sup>2</sup> which limits their use for data interpretation within the range of the Centrope region.

<sup>2</sup> NUTS: Nomenclature of Units for Territorial Statistics. NUTS 3 is district or county level, NUTS 2 is province level. NUTS units need not have an equivalent in existing administrative boundaries of a country.