

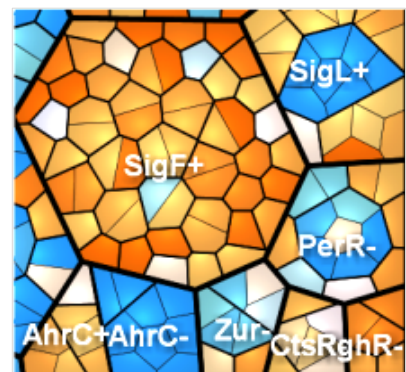
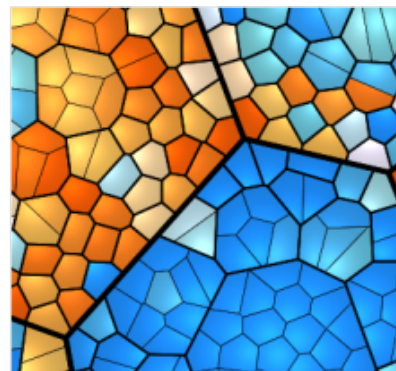
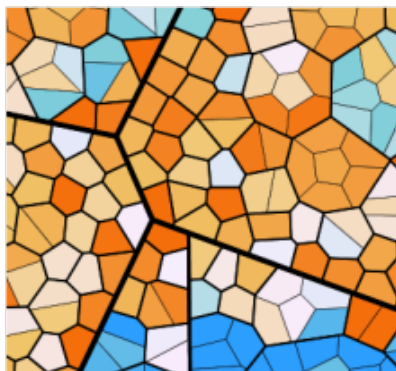
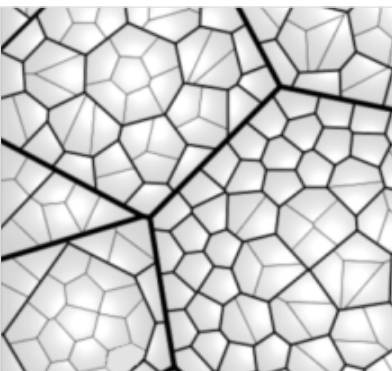
# Getting started

English

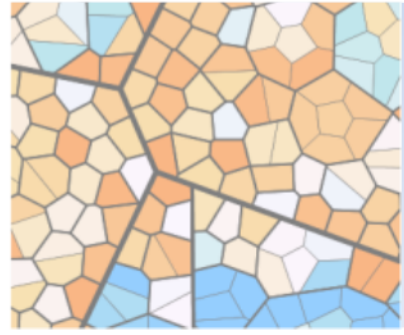


# Paver

WE EXTRACT KNOWLEDGE FROM  
YOUR OMICS DATA

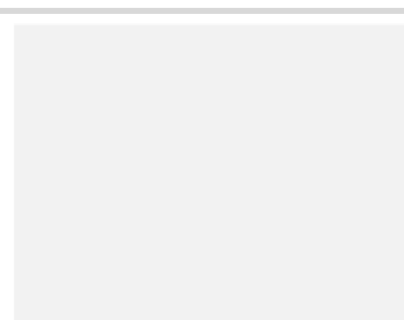
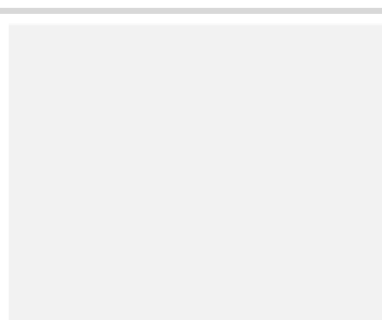






Copyright DECODON GmbH. DECODON makes no representations, express or implied, with respect to this documentation or the software it describes, including without limitations, any implied warranties of merchantability or fitness for a particular purpose, all of which are expressly disclaimed. Users should recognize that all complex software systems and their documentation contain errors and omissions. DECODON shall not be responsible under any circumstances for providing information on or corrections to errors and omissions discovered at any time in this document or the software it describes, whether or not they are aware of the errors and omissions. DECODON does not recommend the use of the software described in this document for applications in which errors or omissions could threaten life, injury or significant loss.

DECODON, the DECODON logo, Delta2D, Paver, SmartVectors are trademarks or registered trademarks of DECODON GmbH in Germany and in several other countries all over the world. The use of general descriptive names, trademarks, etc., in this publication, even if the former are not especially identified, is not to be taken as a sign that such names, as understood by the Trade Marks and Merchandise Marks Act, may accordingly be used by anyone. Where those designations appear in this work and DECODON was aware of a trademark claim, the designations follow the capitalization style used by the manufacturer. Linux is a trademark of Linus Torvalds. Apple, Mac, MacOS, Macintosh are trademarks of Apple Computer, Inc., registered in the U.S. and other countries. JAVA and Solaris are registered trademarks of Sun Microsystems, Inc., 901 San Antonio Road, Palo Alto, CA 94303 USA. Microsoft, WINDOWS, NT, MS PowerPoint, MS Excel, Vista, Windows 7 are registered trademarks of Microsoft Corporation. UNIX is a registered trademark of The Open Group. All other products mentioned are trademarks or registered trademarks of their respective companies. Some software products marketed by DECODON GmbH and its distributors may contain proprietary software components of other software vendors.



## Beginning with Example Data

Paver can create three different types of visualizations:

- Treemaps
- Genome Views
- Stream Graphs

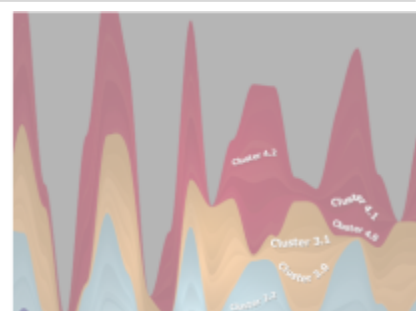
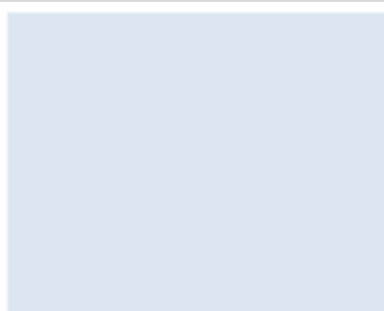
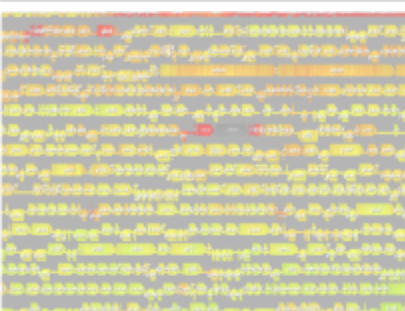
To make it easier for you to get familiar with Paver, we have prepared some example data for each type of visualization. You can do your first steps by simply loading the example data and playing around with it to see how Paver works. Later, when working with your own data, you can refer to our examples to see, how data should be formatted to be compatible with Paver. Simply have a look at their structure and formatting, and adapt your own files accordingly if Paver has problems with your own files.

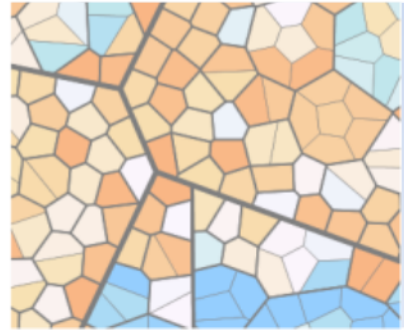
Note:

In this guide we are going to use example data available on our website:

<https://www.decodon.com/paver-getting-started.html> (please scroll down).

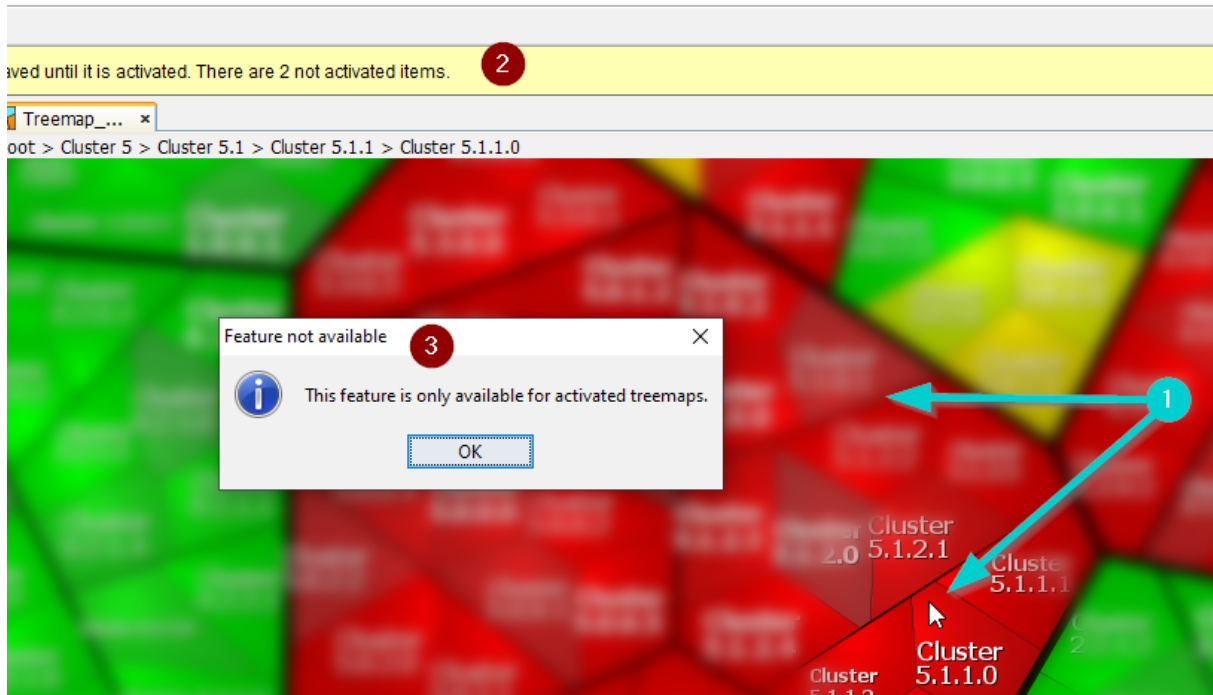
The downloaded files are zip - archives; simply extract them into a directory of your choice. You will obtain a subfolder for each visualization type, containing the hierarchy structure in two or more formats (e.g. path format and simple format), as well as expression data matching these hierarchies in csv (*Character Separated Values*) format. Technically, all files are simple text files containing the information which allows Paver to make those beautiful visualizations. You can open every one of them with any editor software, which is capable to interpret Linux and Apple text files as well.





## Consumable License Model and Example Data

When opening any data with Paver, you will notice three things:

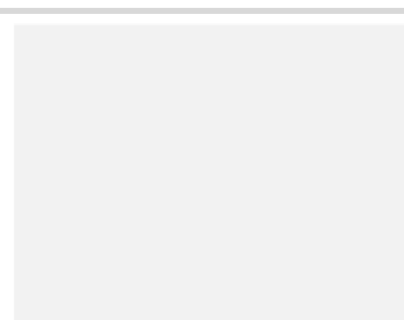
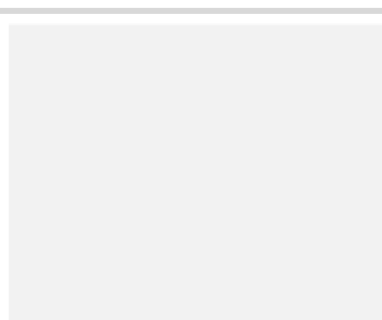


1. The representation is all blurred, except for a small region around your mouse pointer.
2. A big yellow stripe on the top of the window with a button on its left saying "**Activate**".
3. Saving and exporting data is disabled.

The blurred view is the **demo view** you will always get when loading data without either having activated it before or using a full license for Paver. Click on the just appeared "Activate" button to remove these limitations, you will be asked for credentials of an account to activate data with. For your own data, you will need an own consumable account.

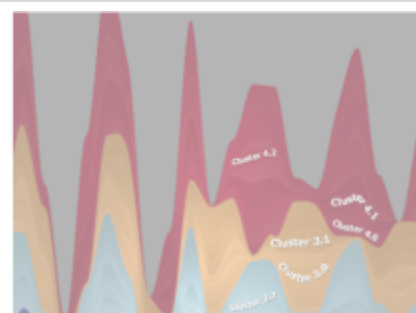
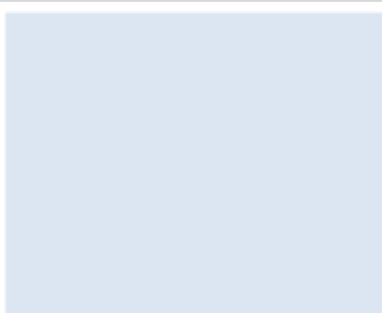
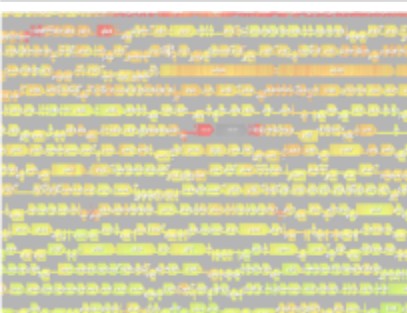
To **activate the example data for free**, please use our evaluation account:

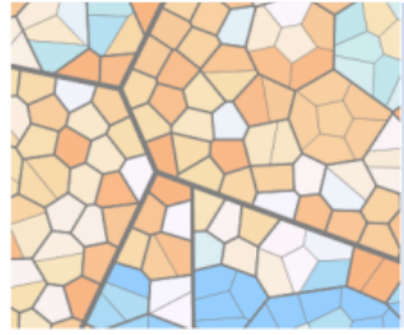
User Name: *eval*  
Password: *paver*



Make sure the treemap and the expression data are selected (they are by default) and click on "**Activate**". After some seconds you will see the Activation Report in a small window and your blurred view becomes clear.

Once activated, these files will always stay activated on your computer, as long they are not modified. Now you can save the created visualizations and load them again later with **File -> Load Visualization**, without having to create or activate them again. Saving makes it easier to re-use your visualization later on, with the same or with new expression data. Thus it can save a lot of time: while calculating these small example files happens really fast, it can take quite long for real complex hierarchies. Reloading such a complex hierarchy as already saved visualization later takes only seconds.



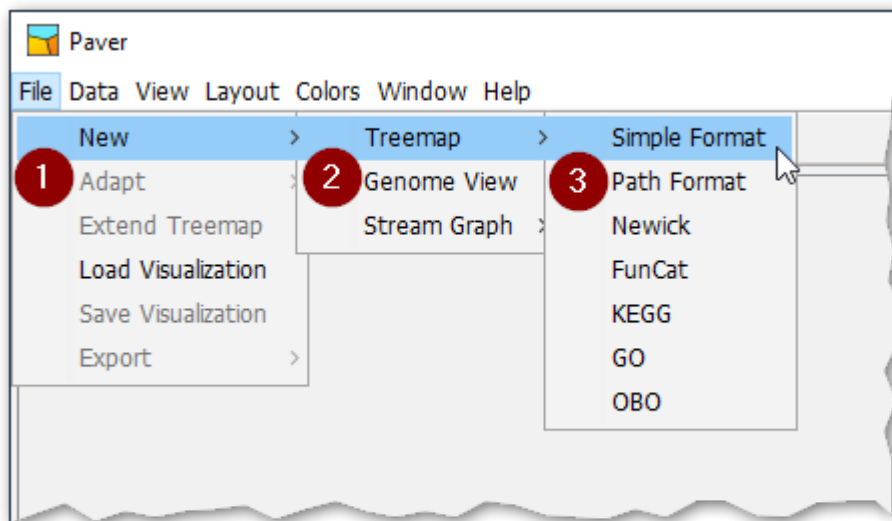


## Creating amazing visualizations in two steps

Generally, creating visualizations with Paver goes in two steps:

### 1 Create a new Visualization by loading the Hierarchy

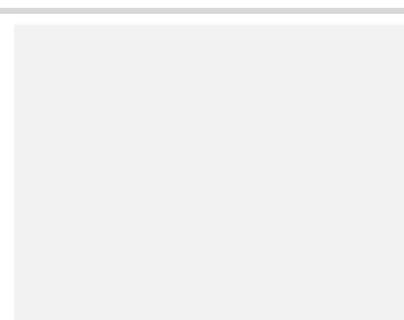
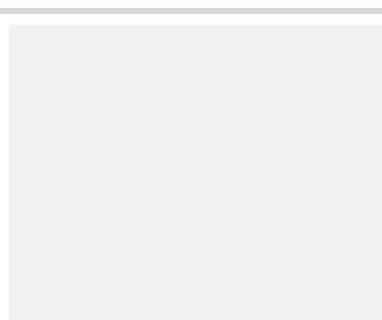
Load hierarchy data to calculate the Voronoi Treemap of hierarchy levels and related entities.



Open Paver's **File** menu and tell Paver that

- 1 you want to create a new visualization
- 2 of this type,
- 3 and in which format the hierarchy is you are going to load.

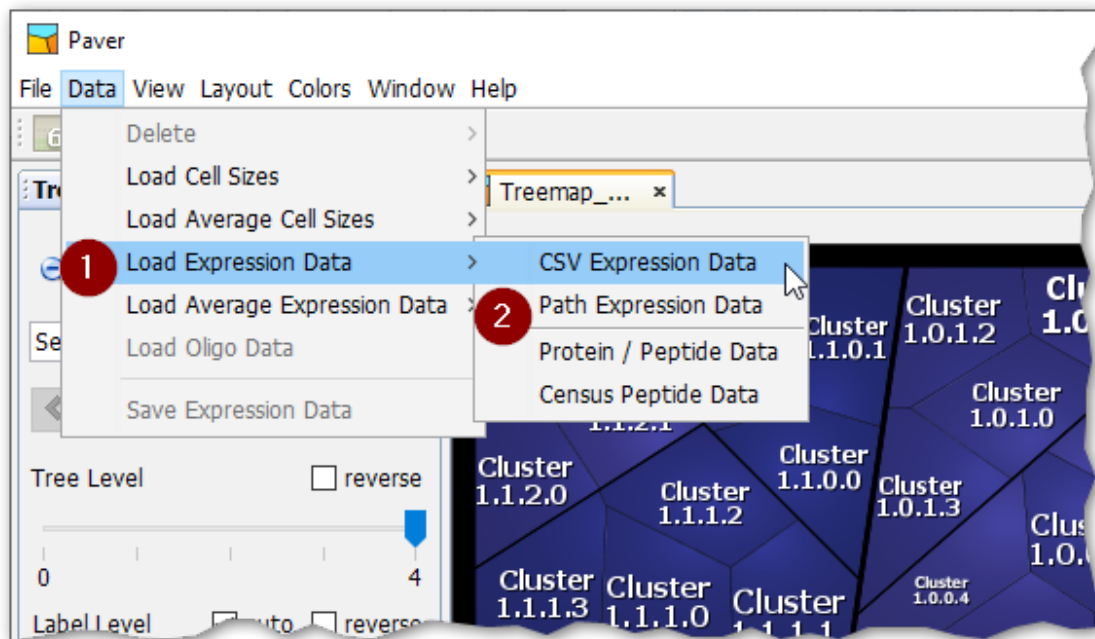
A File Chooser will open, allowing you to choose the file you want to open.





## 2 Load Data

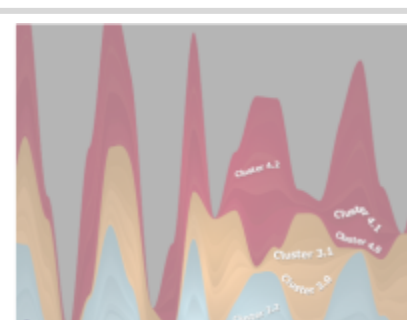
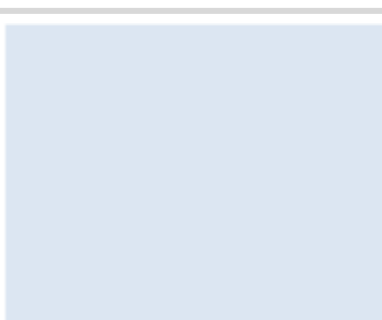
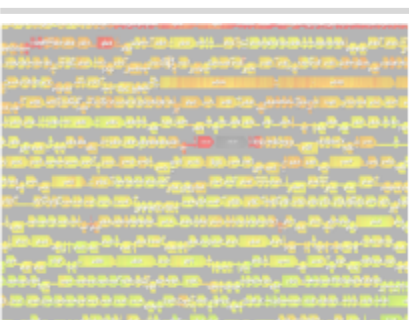
Load expression data to fill the created treemap with life



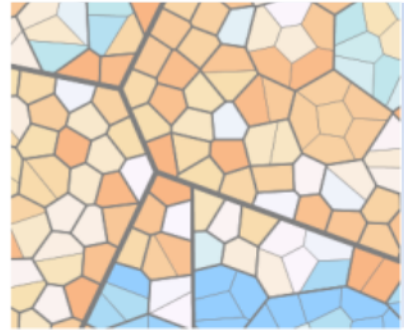
Now you can involve quantitative data you want to visualize either by the cell size or the coloring of your cluster cells, either individually or by its average:

- 1 let the data influence the size or the coloring of your cells, either individually or their calculated average
- 2 and interpret the data in this format.

Depending of the type of visualization, some additional steps, like e.g. loading additional data rows or finetuning, can become necessary.



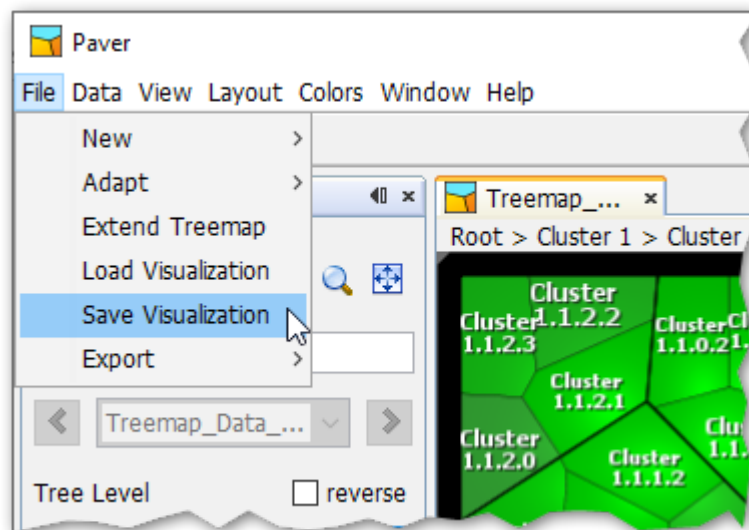




## Saving and Exporting Visualization

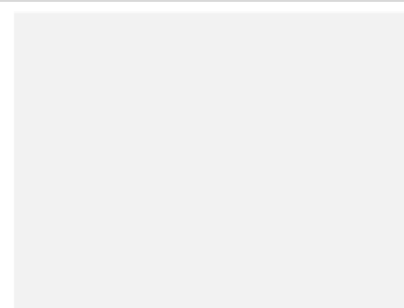
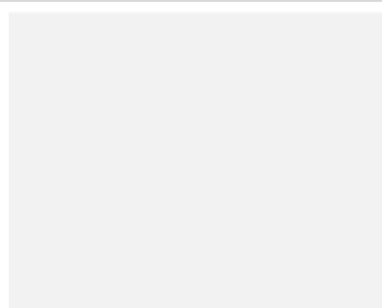
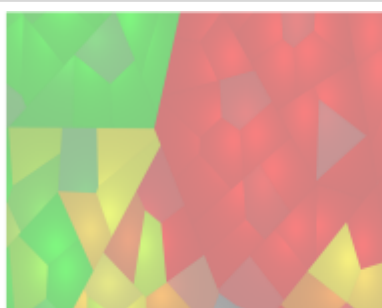
After having created a visualization, you can **save** it for re-using it later on in Paver, or you can **export** it in various formats you can use in your presentation, paper, web application, ....

To **save** it, again open the *File* menu and click on *Save Visualization*:

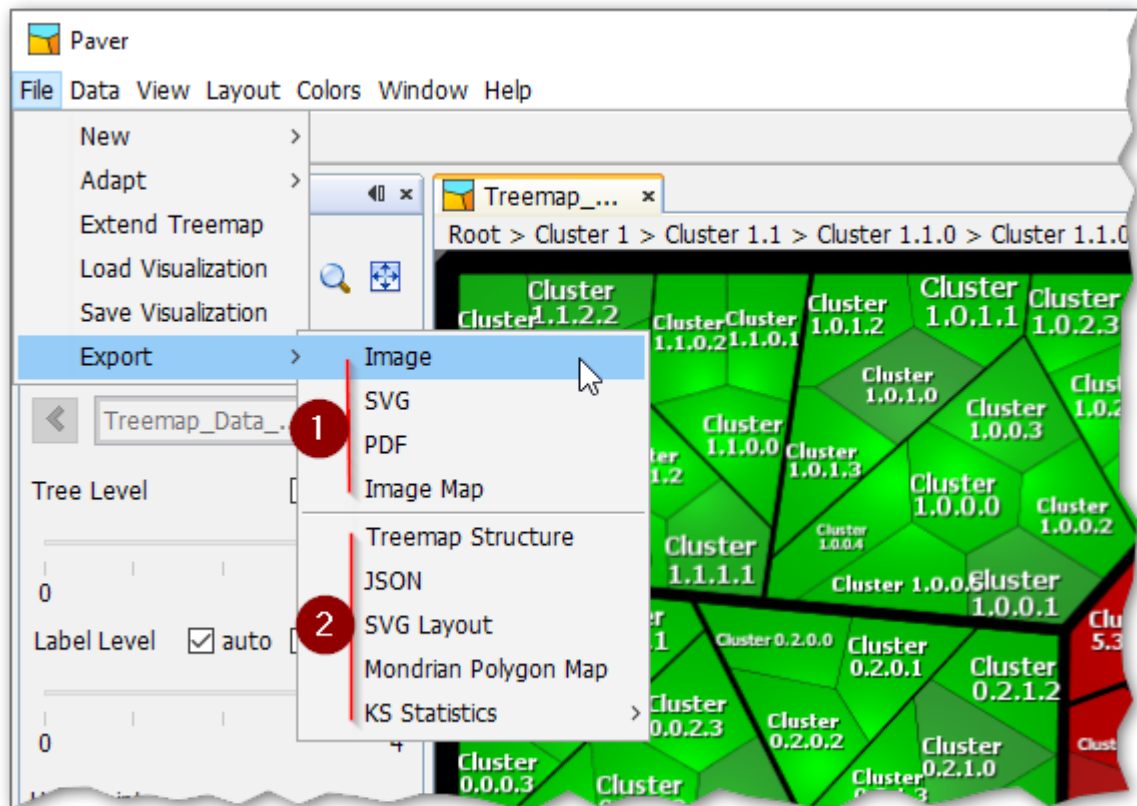


You can choose a location and a name where to save your visualization. To re-use it in Paver, make sure to choose *Load Visualization* from this menu, (and not *New->...*)

Although the coloring of the cells will be preserved in the state it was saved, you can load other (or the same) expression data, with the same or a different color scheme to illustrate different facts.

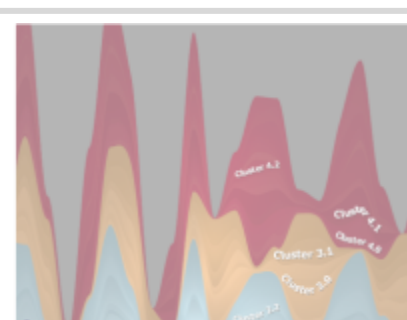
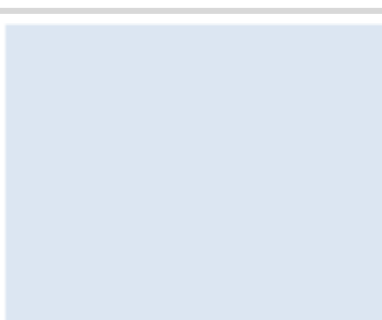
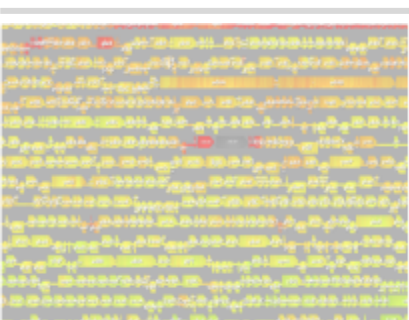


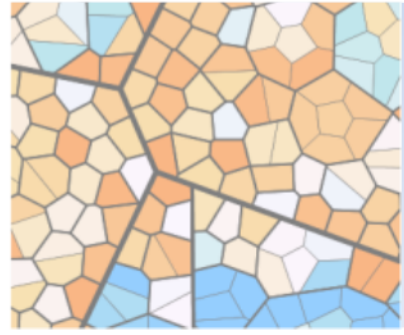
Depending on your needs, you can **export** visualizations in various formats:



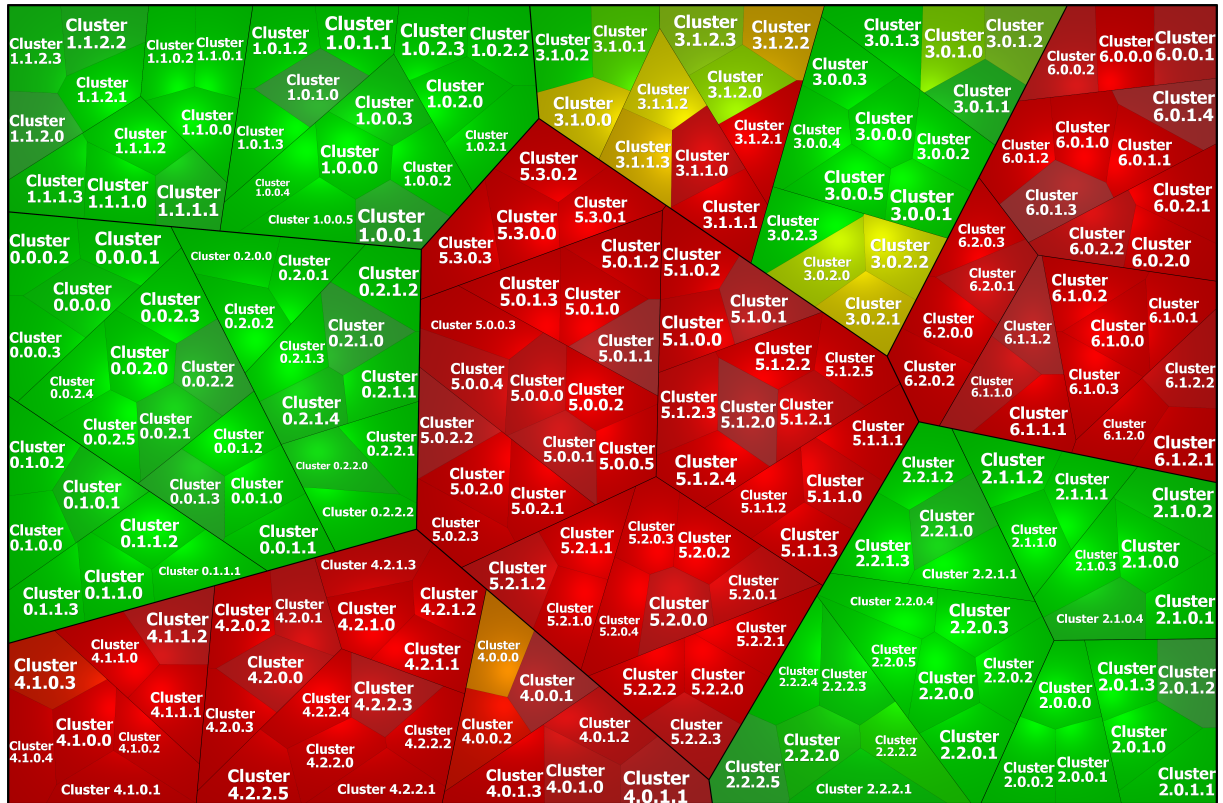
As you can see in the screenshot, you can export a visualization in 9 different formats. According to their characteristics they are organized in two groups:

- 1 visual formats - maintaining the look of your visualization as you can see it in Paver's window (colors, borders, labels, ...), to be used for illustrations
- 2 technical formats - making the structure of your visualization accessible to other applications.



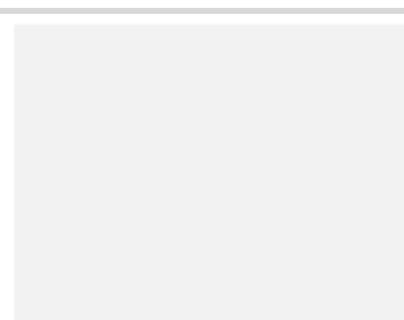
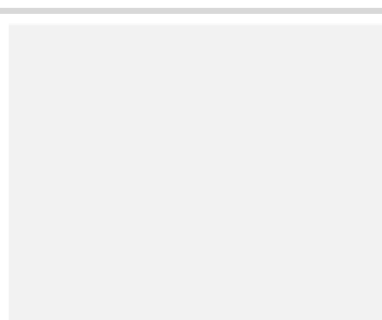


## Creating a Treemap



The folders and files are named according to Paver's menu entries, so you can easily find the matching file(s) you have to load for creating your visualization. Let's create a treemap as example:

- In Paver's menu click on **File -> New -> Treemap -> Simple Format** and navigate to the extracted "Example\_Treemap" folder
- Pick the file "Treemap\_Simple\_Format.tms" or any variant from the "SimpleTreemapFormat" folder and open it to load the hierarchy file.
- Now choose from Paver's menu **Data -> Load Expression Data -> CSV Expression Data** to load the data files as expression data.
- In the file chooser you can pick one or both "Treemap\_Data\_X.csv" files (where X stands for a number) and click on **Open**.

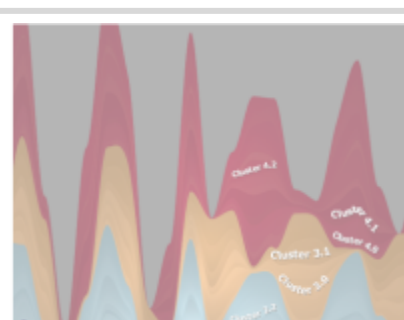
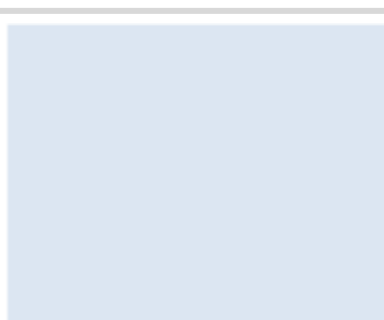
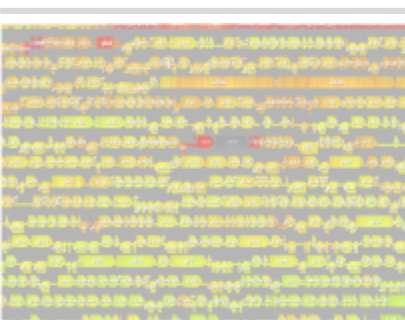


## Creating a Genome View

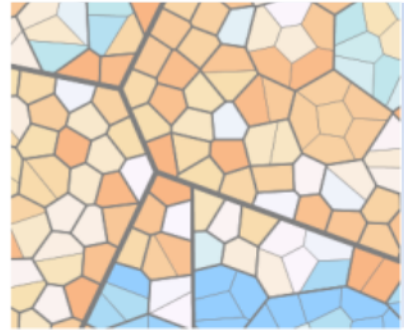


Creating a Genome View works analogous:

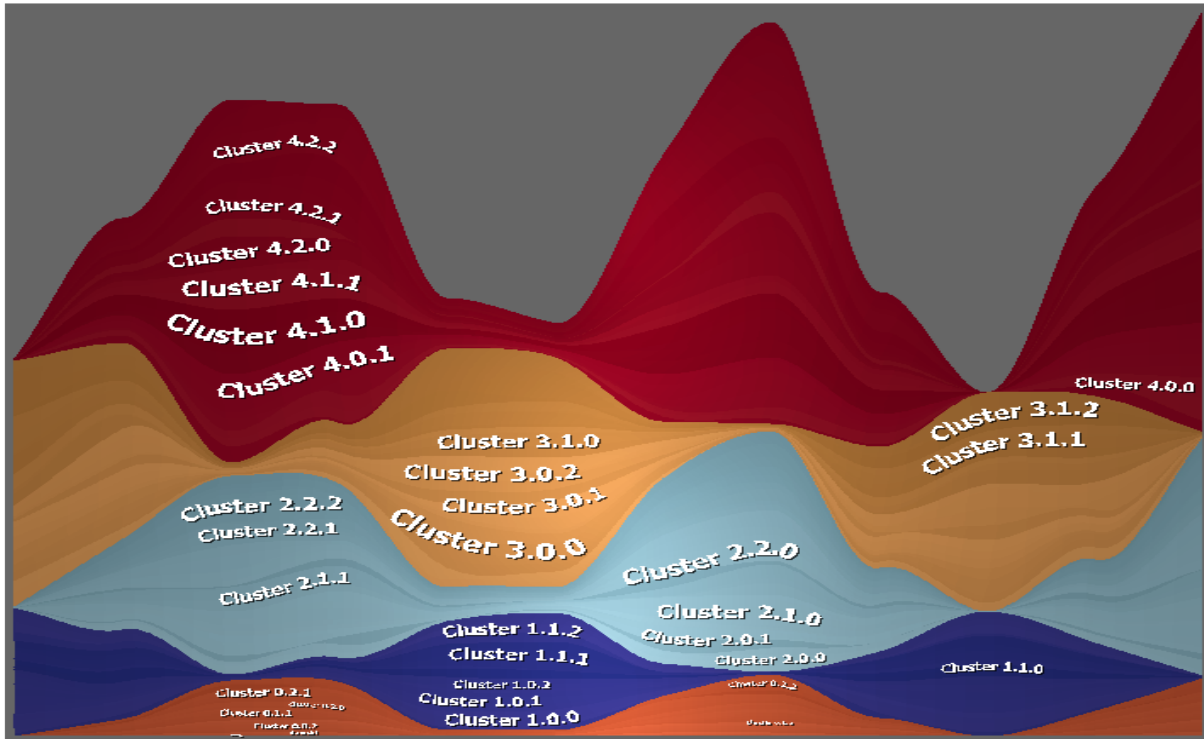
- Click on **File** -> **New** -> **Genome View** and navigate to the extracted "Example\_Genomeview" folder.
- Choose the *Bacillus subtilis 168.csv* file and open it.
- Now choose from Paver's menu **Data** -> **Load Expression Data** -> **CSV Expression Data** to load the data files as expression data.
- In the file chooser you can pick one or both "GenomeView\_Data\_X.csv" files (where X stands for a number or other further description) and click on **Open**.





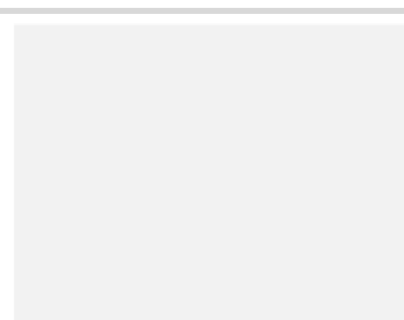
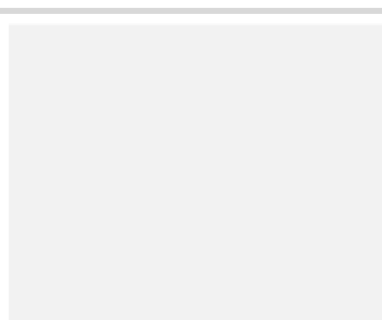


## Creating a Streamgraph



Creating a Stream Graph works the exact same way:

- In Paver's menu click on **File -> New -> Streamgraph -> Simple Format** and navigate to the extracted "Example\_Streamgraph" folder.
- Pick the file "*Streamgraph\_Simple\_Format.tms*" to load the hierarchy file.
- Unlike to the procedure with the other visualizations, you will be asked directly to load your data files. As a second peculiarity of this visualization type you will need to load multiple data files to obtain a Stream Graph.



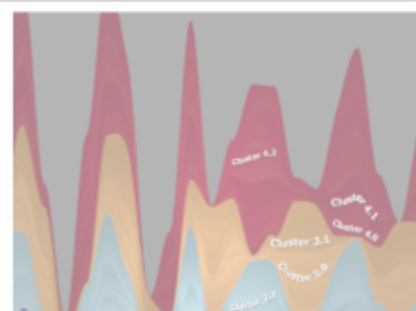
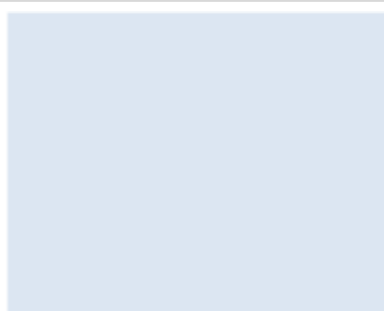
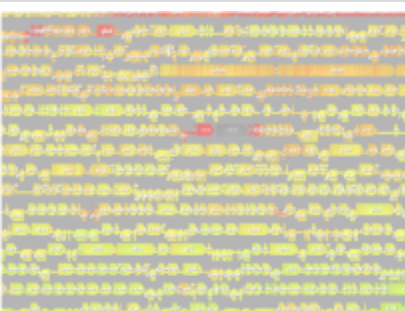
## Where Can I Find Out More about Paver?

The easiest way to learn more is going to <http://www.decodon.com> or contacting us per Email to [info@decodon.com](mailto:info@decodon.com). We will be happy to answer your questions or to show you more in a live web demo.

Your DECODON Team

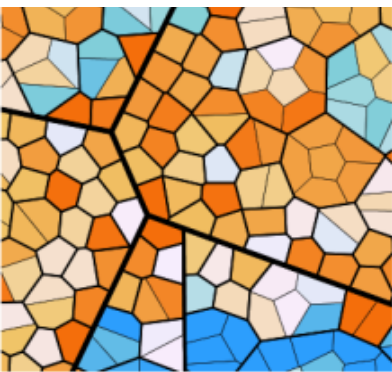
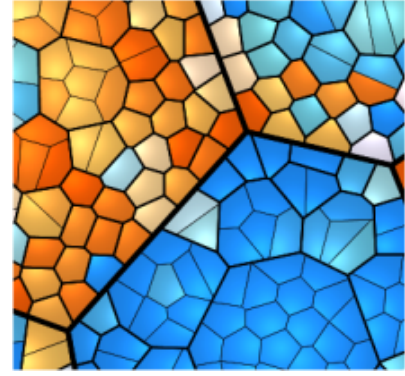


If you have any comment or suggestion regarding this '**Getting Started with Paver Guide**' or any other of our documents we welcome hearing from you.









### Request your personal demo today!

**Want to know more?** Contact us today to arrange your personal live web demo. All you need is a web browser and a phone – an expert will show you how you can apply Paver to visualize high-level expression patterns.

You can download an evaluation version of Paver from [www.decodon.com](http://www.decodon.com). Your questions and remarks are welcome, call us at +49 3834 515230 or send an email to [info@decodon.com](mailto:info@decodon.com).

### Technical data:

**Supported Classification Schemes:** Paver supports

- Gene Ontology
- KEGG Brite
- Riley scheme derivatives (e.g. TIGR classifications, Genolist classifications)
- Clusters of Orthologous Groups (COG)
- Open Biology Ontologies (OBO)
- gene regulatory data
- custom classification schemes.

**Supported Export Formats:** Paver supports the export into the graphical formats image (PNG, TIFF, JPEG, BMP), vector based SVG, SVG Layout, PDF, Mondrian Polygon Map and html Image-Map. Furthermore Paver supports export of the treemap structure in XML and JSON, and of the Kolmogorov-Smirnov-Statistics.

**Supported Operating Systems** (\*recommended): Paver runs on Windows 10\* / 8 / 7 / Vista / XP at 32 or 64\* bit, Mac OS X 10.7.3 (Lion) or higher, and most flavours of 32 bit or 64\* bit Linux.

### Hardware Requirements:

Minimum Hardware:

Pentium III, 800 MHz, 2 GB RAM or Intel-based Mac, 2 GB

Recommended Hardware:

Dual or Quad Core Processor with 2 GHz or better, 4 GB RAM or more, in combination with a 64-Bit operating system



DECODON GmbH  
Walther-Rathenau-Str. 49a  
17489 Greifswald, Germany

[www.decodon.com](http://www.decodon.com)  
[info@decodon.com](mailto:info@decodon.com)  
phone: +49(0)3834 515230  
fax: +49(0)3834 515239

### Copyright and Trademarks

All material in this brochure is Copyright © DECODON GmbH. All Rights Reserved. DECODON, DECODON logo, Delta2D, and Paver are trademarks or registered trademarks of DECODON GmbH in Germany and in several other countries all over the world. All other products mentioned are trademarks or registered trademarks of their respective companies.