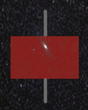
WeatherMagic

Back end

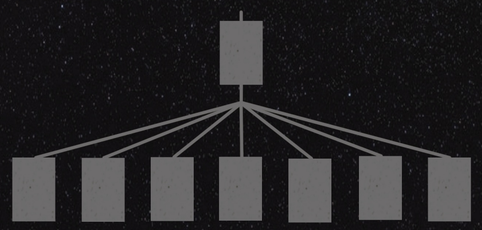
Thor is the name of the WeatherMagic back-end. Written in Python 3 with numpy and flask, it excells at delivering data from NetCDF files containing data from climate simulations.

The Thor HTTP API - a Restful API which allows clients to ask for any data from within the server dataset and get it delivered as a small size PNG.

For the data to be sent to the front end application it needs to be converted into a PNG image. This is to reduce computational costs and to increase transfer speed. Only the red image channel is used when transfering data.

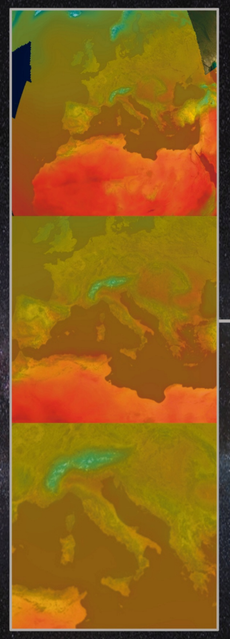


Over 800 files are searched in real time when a request is made to the server. Several files can hold the data being requested. The relevant data from each file is stitched togheter into a matrix.

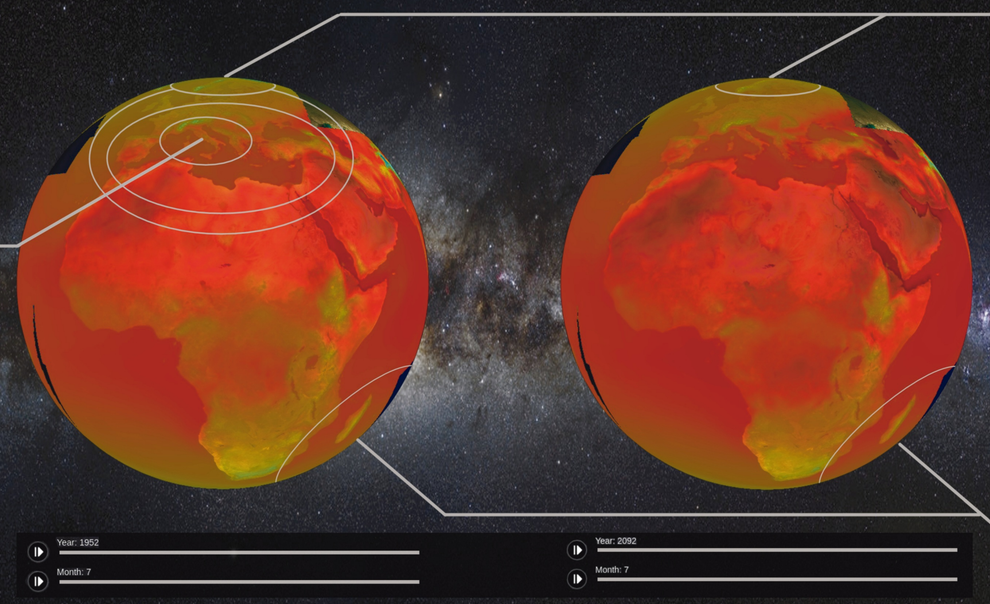


http://www.eso.org/public/images/eso0932a/ Serge Brunier

Front end

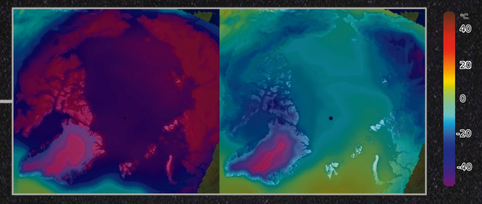


WeatherMagic has different zoom-levels, allowing for both detailed and overview snapshots of the climate at any given location. The climate data is fetched for you dynamically on the fly - assuring that you allways get the correct resoution for the zoom-level on your display.

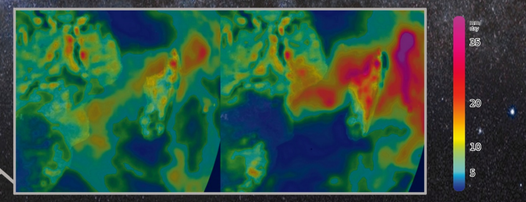


There are four sliders, two for each globe making it possible to choose between different points-in-time and compare the climate changes. There are also play buttons connected to the time sliders making it possible to make the time pass continuously.

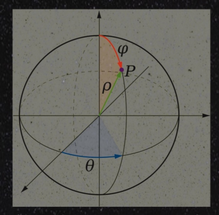
The time span provided in the time sliders are from the year of 1950 to 2100 and all twelve month of the year is possible to choose. Each time the date changes a request is sent to the back-end server which delivers the requested image fast and effortlessly.



Temperature is visualized in several colors to let the user grasp large differences over time. Linear interpolation is performed between all colors, from cold purple to warm red.



Precipitation is visualized with different linearly interpolated colors. Areas with drought can be seen by the absence of precipitation over a longer period.



Rotating the globe is done using real-time calculated algebraic operations. This gives the freedom to really play around with the earth rotation from above. Come on and try it - it feels wonderful to just spin the world for a minute.

WeatherMagic is accessible to the every day man at weathermagic.se using only a web browser. It allows the user to easily compare and contrast the predictions of different climate models and exhaust curves with the click of a button.

All data used is taken from weather institutes around the world manly from the CORDEX project which can be accessed by going to www.earthsystemcog.org

Being written in ClojureScript granted its developers the ability to modify the running application through the simple act of saving a modified source file, without destroying the apps running state.

The entire project was done open source and all code can be accessed by going to www.github.com/WeatherMagic . If you find our work intresting and our code readable, feel free to fork it and contibute.