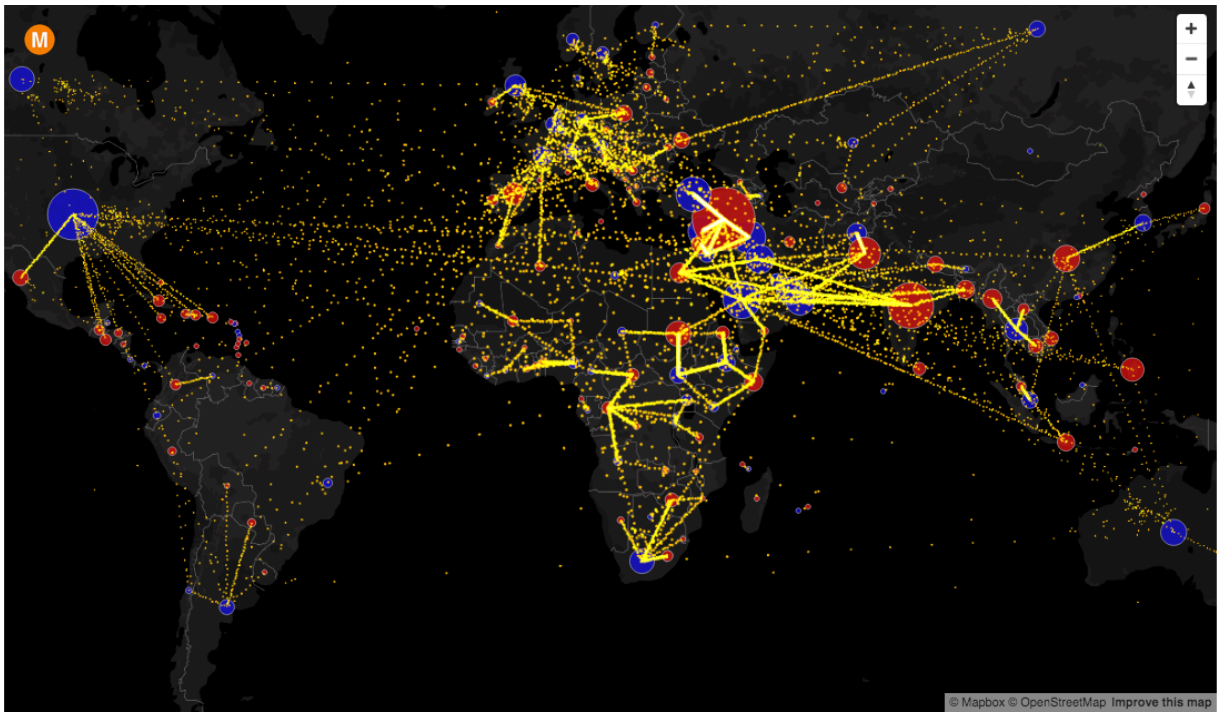
Human Migration Map

- state of the art -

The idea of this project came from the the fact that are few accessible applications that allows users to see detailed informations about the human migrations around the whole world. This kind of instrument can be useful in many fields, especially in politics and economics, but everyone can have some conclusions after seeing a real-time updated map with highly interested destinations.

A project which shows a map with the estimated net immigration (inflows minus outflows) by origin and destination country was developed by Max Galka[1]. The data for this map comes from the U.N. Population Division and the author wants to answer to this questions: How many migrants are there? Where are they coming from? Where are they going? His goal was achieved and now everyone can see that, for example, the net migration from Syria to Sweden was more than Syria's net migration to the rest of Europe and the Americas combined.



[1] http://metrocosm.com/global-immigration-map/

Despite of this interesting features the map of Max Galka has a big disadvantage: the information is now outdated because the map shows knowledge about migration between 2010 and 2015. Another thing is that the numbers are not fully consistent. In some cases, they represent foreign citizens and in others they represent foreign born. To calculate the the immigration estimates, Max looked the difference between the migrant stock in 2015 and that in 2010. Since some of that difference is due to mortality, not immigration, he adjusted the 2010 numbers down assuming an annual mortality rate of 0.8%, the global average.

Also, it would be extremely useful if we could know why some people from country A are going to country B. We want to provide this information too in our Human Migration Map project. To achieve this we will analyze also the social networks traffic.

MigrationMap.net

MigrationMap.net is an website created by Martin de Wulf with the idea to be able to view for every country in the world, the top ten providing countries of lifetime migrants or the top ten receiving countries of lifetime migrants. On top of that, the website also shows you the total population, the GDP per capita, the HIV and Tuberculosis prevalences and the death rate of children under five years old of the country selected.

The data for the migration map is collected from the Global Migrand Origin Database. The main point is that it uses a matrix for showing each pair of country X and Y, the number of people born in a country X and now living in country Y. As for the rest of the indicators (population size, GDP, HIV and tuberculosis prevalences and mortality for kids under five years old), it uses the World Bank API, with the numbers for 2007.

The technologies used to create the application:

- Raphael.js for the display in SVG the countries borders, the “arrows” and animating everything;
- Color Brewer by Cynthia Brewer for the red hues to display migration intesity;
- Python with the Requests library to transform all data in a format that can be used and to acces the World Bank API;

- Hasher.js for the url hashes manipulations (so that people can bookmark maps);
- Modernizr for detecting if the current browser supports geolocation;
- JQuery.

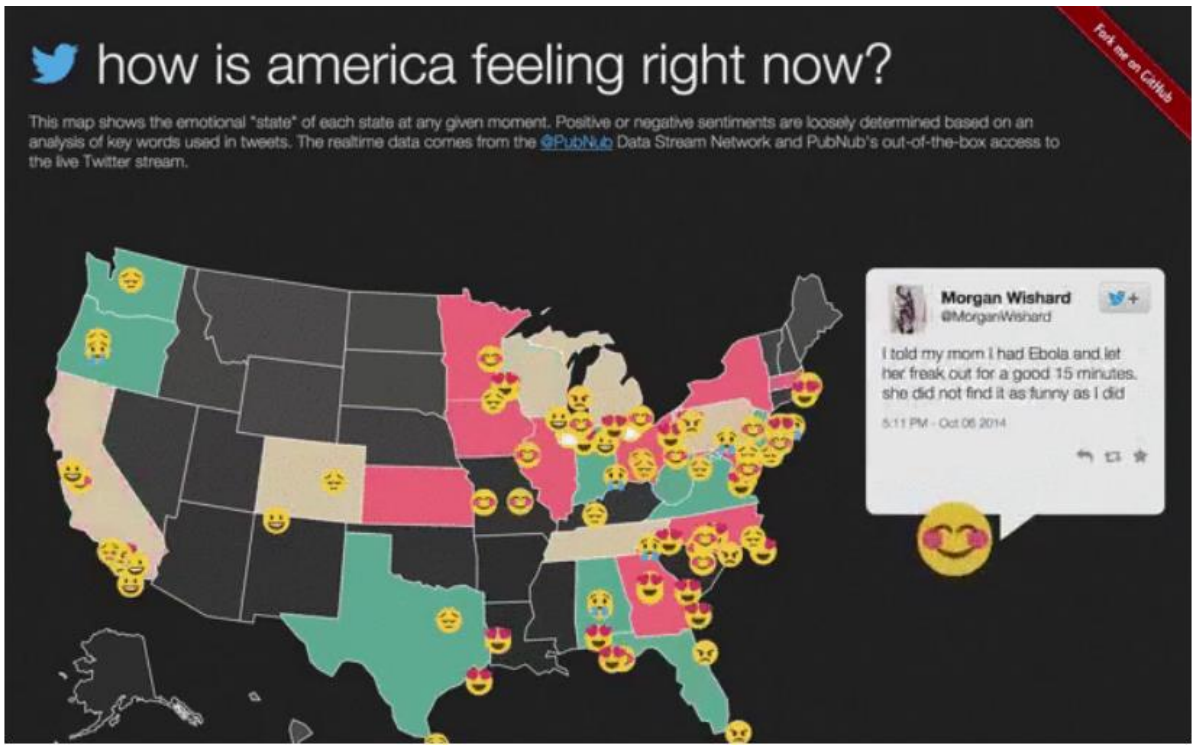
The PubNub Data Stream Network

The PubNub Data Stream Network offers a way to access a huge stream of data in real-time, in a fast and powerful manner.

For that, a Data Firehose API comes in handy. Because data is always changing, we need to cope with this situation in such way that the continuous data stream updates client applications, dashboards, charts etc. This mechanism allows us to solve the above-mentioned situation because the data continues to flow until it is crunched.

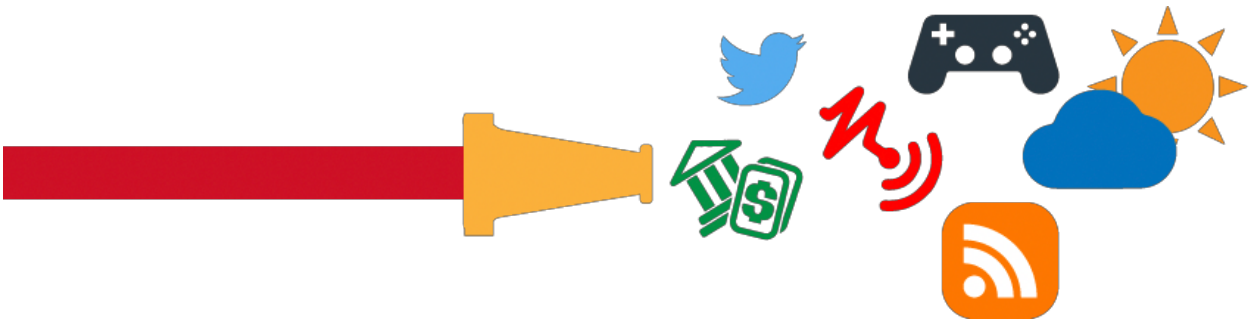
A real-world example is the Twitter firehose that delivers tweets to end users in real-time, at a calculated average of 5700 tweets / second.

A cartographic example of feelings based on emoticons in USA is shown below:



In this example, the stream is analyzed by looking for certain words and emoticons found in the incoming tweets from different persons and then maps those persons according to their emotional state.

Other use case examples range from weather forecast data, stock prices, public transportation time and location, RSS feeds etc.



The data streaming need appeared back in the 1990s, along with the rise of Layman's Internet. At first, there was the capability to transfer multipart content-type (like audio, video, images). Afterwards, the Realtime Streaming Protocol was instated.

Articles and books:

1. Semantic Web Technologies by John Davies, Rudi Studer and Paul Warren
2. TweepsMap
3. United Nations International Migration
4. Forecasting With Twitter Data by Marta Arias, Argimiro Arratia and Ramon Xuriguera, Universitat Politecnica de Catalunya
5. Prying Data out of a Social Network (Facebook) by Joseph Bonneau and Jonathan Anderson , Computer Laboratory University of Cambridge
6. Real-Time Tweet Stream Analysis
7. What is a Data Firehose API