

UNICEF DASH-SDMX

*Open source application to build
configurable SDMX-enabled
dashboards*

Daniele Olivotti

Frontier Data and Tech Unit

Section of the Chief Data Officer



The current situation

- There is huge demand for data visualization and the requests are increasing
- Data is changing fast, and deadlines are tight!
- Sometimes we just need to embed a simple chart in a page to support a “story”
- There could be no capacity to use PowerBI, Tableau... in some teams



The current situation (2)

- We have PowerBI, Tableau, R or other custom solutions which are difficult to reproduce dynamically and repeatedly.
- Is staff, time and capacity available to maintain the dashboards?
- The data is available in SDMX format and accessible using the APIs, can we take advantage of that?
- Can we get rid of intermediate formats and processing?



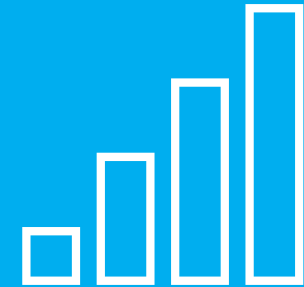
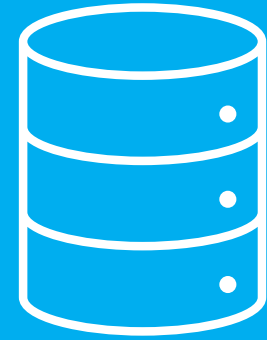
The need

- A solution that allows simple dashboards to be created quickly
- No need to deeply understand SDMX
- Fetch data from the APIs to avoid local copies
- Fast to configure and deploy
- Multi-Project/Tenant (we have several country and regional offices)
- Easy to embed in a public facing web page



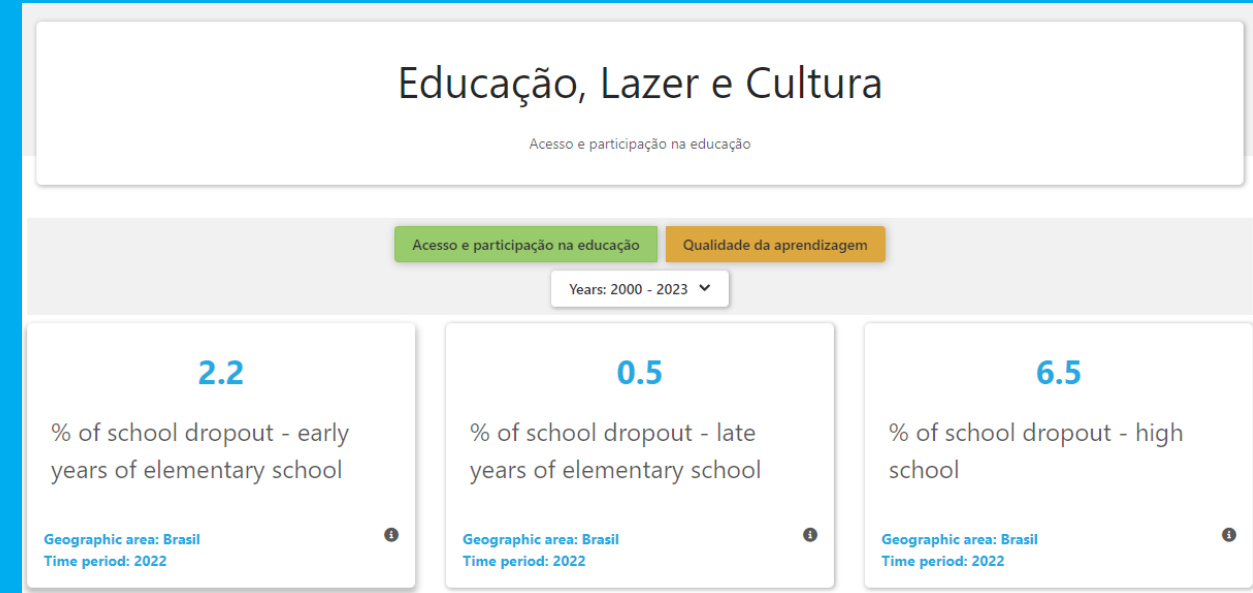
The solution

- An application that connects data and charts
- The user defines the “slice” of data he wants to visualize and the type of chart/map.
- The application generates one or more widget
- Data is dynamically pulled from the SDMX registry



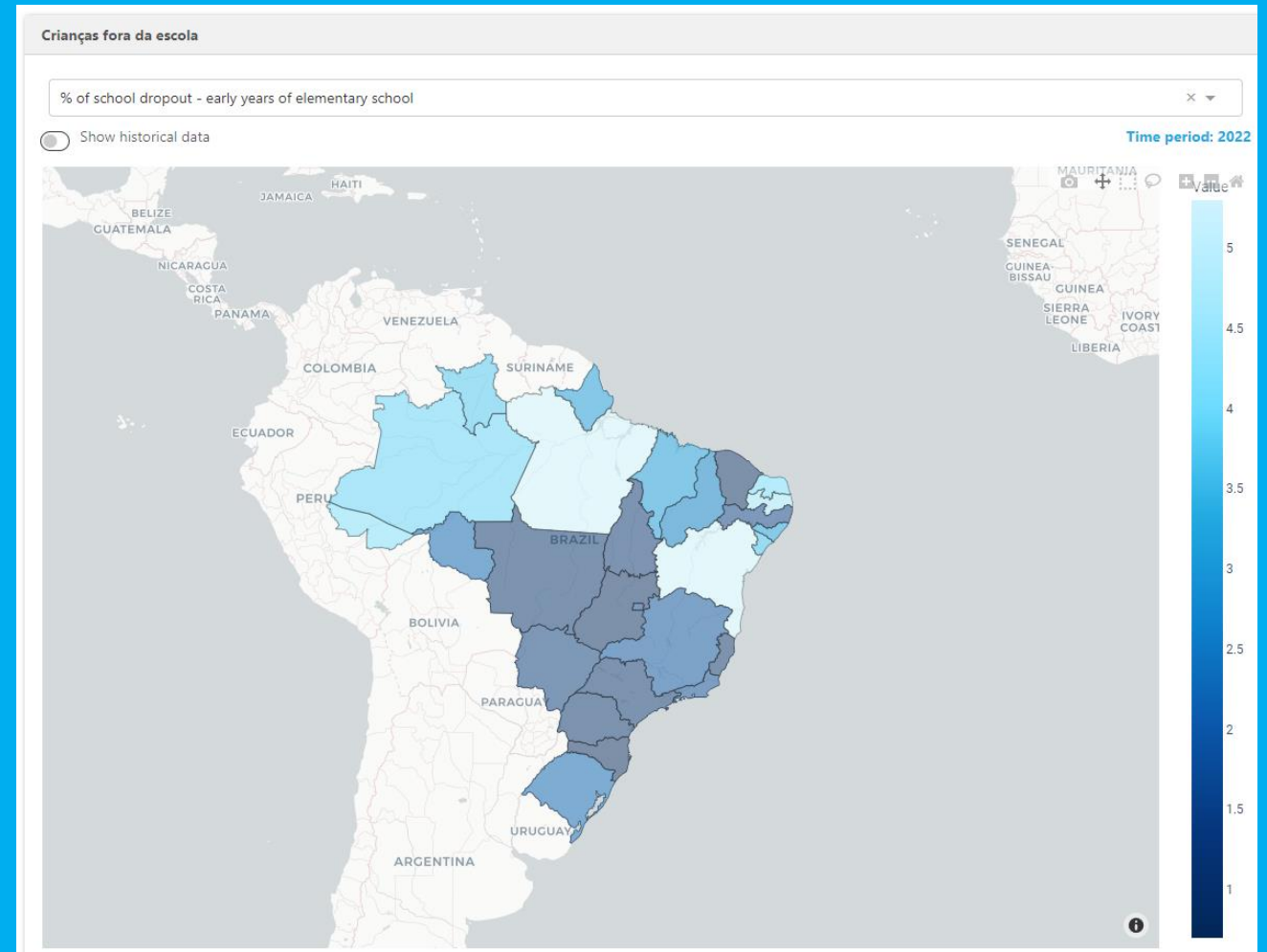
The application's frontend: Title, Subsections and Cards

- Page title and sub-sections (if needed)
- Cards: they show a single value
- Components are arranged in rows, any component can be shown on any row or column
- The page can contain any number of elements



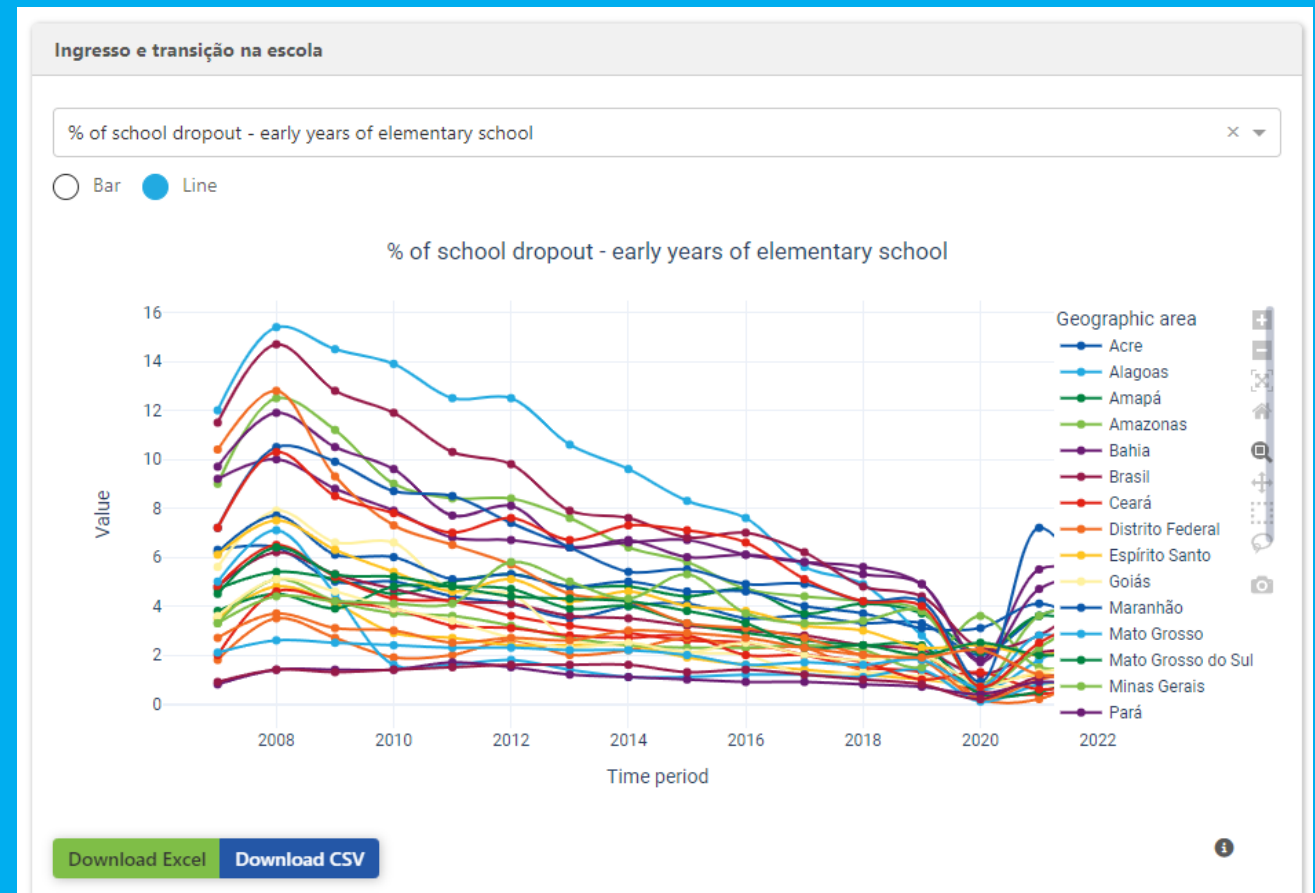
The application's frontend: Map

- Can show a single year or play through a time series



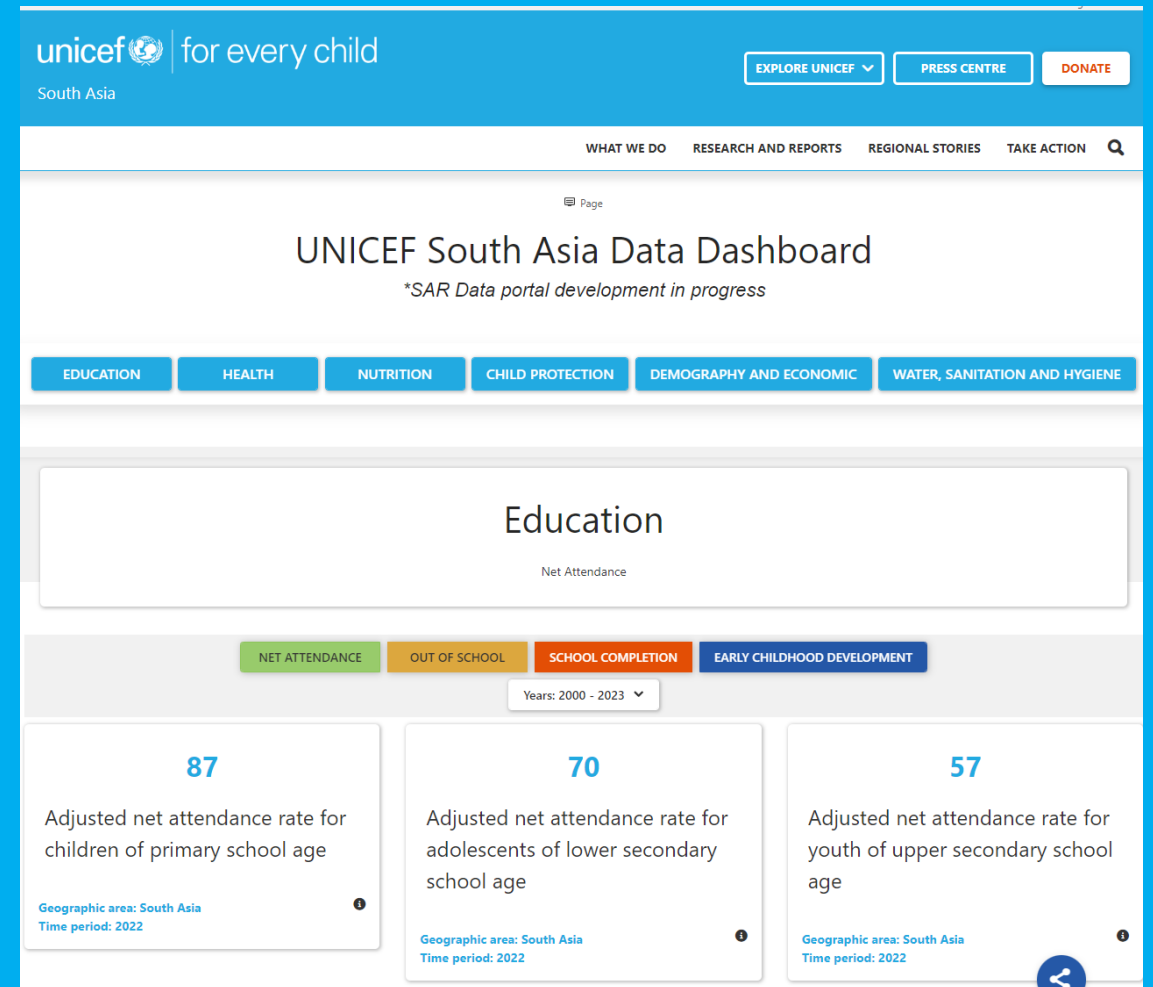
The application's frontend: Charts

- Shows a Bar or a line chart.
- It can be easily extended to handle additional chart types



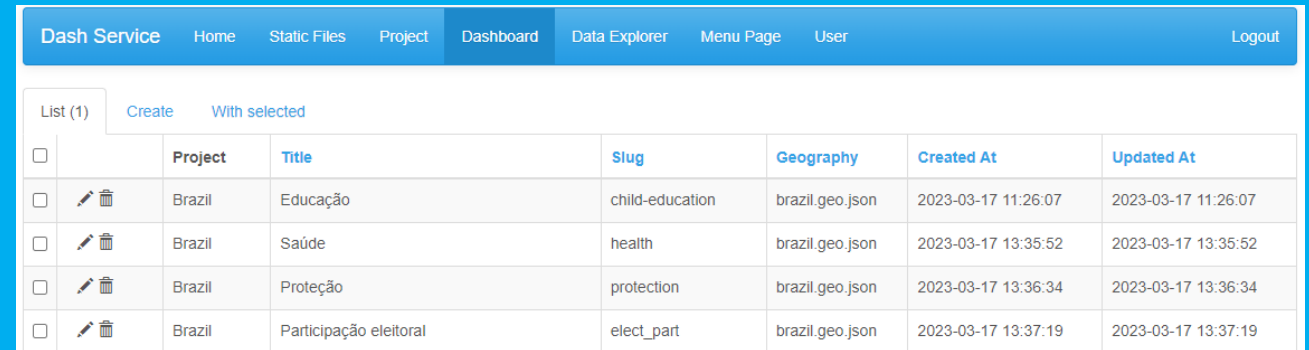
Embedding the dashboard in another page

- The dashboard can live independently or can be embedded in an existing page
- In the example the dashboard is embedded in data.unicef.org



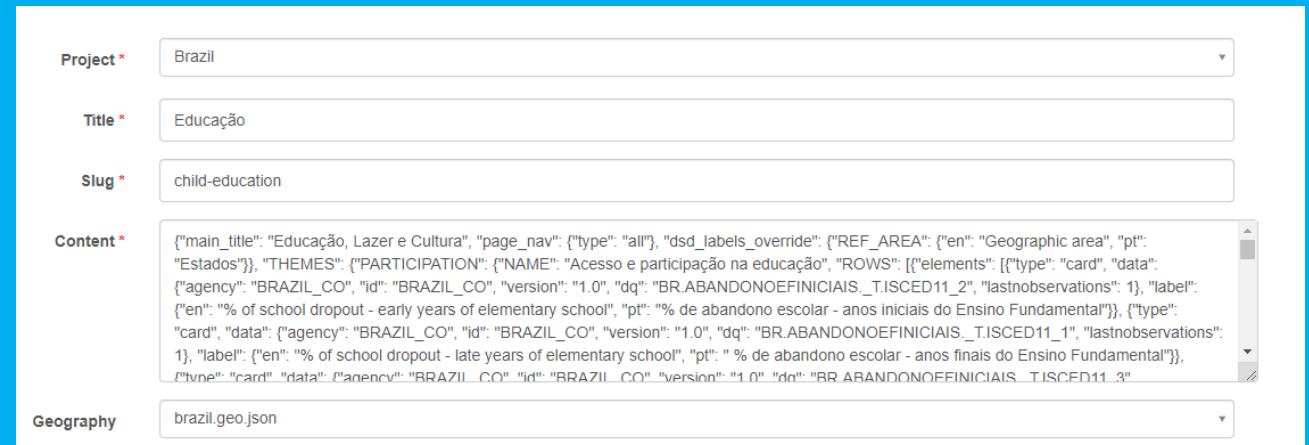
The application's backend (needs refinement)

- The dashboard is configuration driven
- The backend tool allows to create new projects and pages.
- Configuration files contain the SDMX data query and how to show the returned data (data query + chart type → Render)



A screenshot of a web application interface showing a table of configuration items. The table has columns for Project, Title, Slug, Geography, Created At, and Updated At. There are four rows of data, each with a checkbox and edit/delete icons on the left. The navigation bar at the top includes 'Dash Service', 'Home', 'Static Files', 'Project', 'Dashboard', 'Data Explorer', 'Menu Page', 'User', and 'Logout'.

| | Project | Title | Slug | Geography | Created At | Updated At |
|--------------------------|---------|------------------------|-----------------|-----------------|---------------------|---------------------|
| <input type="checkbox"/> | Brazil | Educação | child-education | brazil.geo.json | 2023-03-17 11:26:07 | 2023-03-17 11:26:07 |
| <input type="checkbox"/> | Brazil | Saúde | health | brazil.geo.json | 2023-03-17 13:35:52 | 2023-03-17 13:35:52 |
| <input type="checkbox"/> | Brazil | Proteção | protection | brazil.geo.json | 2023-03-17 13:36:34 | 2023-03-17 13:36:34 |
| <input type="checkbox"/> | Brazil | Participação eleitoral | elect_part | brazil.geo.json | 2023-03-17 13:37:19 | 2023-03-17 13:37:19 |



A screenshot of a configuration form with fields for Project, Title, Slug, Content, and Geography. The Project field is a dropdown menu with 'Brazil' selected. The Title field contains 'Educação'. The Slug field contains 'child-education'. The Content field is a large text area containing a JSON configuration object. The Geography field is a dropdown menu with 'brazil.geo.json' selected.

Project * Brazil

Title * Educação

Slug * child-education

Content *

```
{ "main_title": "Educação, Lazer e Cultura", "page_nav": { "type": "all", "dsd_labels_override": { "REF_AREA": { "en": "Geographic area", "pt": "Estados" } }, "THEMES": { "PARTICIPATION": { "NAME": "Acesso e participação na educação", "ROWS": [ { "elements": [ { "type": "card", "data": { "agency": "BRAZIL_CO", "id": "BRAZIL_CO", "version": "1.0", "dq": "BR.ABANDONOEFINICIAIS_T.ISCED11_2", "lastobservations": 1, "label": { "en": "% of school dropout - early years of elementary school", "pt": "% de abandono escolar - anos iniciais do Ensino Fundamental" }, { "type": "card", "data": { "agency": "BRAZIL_CO", "id": "BRAZIL_CO", "version": "1.0", "dq": "BR.ABANDONOEFINICIAIS_T.ISCED11_1", "lastobservations": 1, "label": { "en": "% of school dropout - late years of elementary school", "pt": "% de abandono escolar - anos finais do Ensino Fundamental" }, { "type": "card", "data": { "agency": "BRAZIL_CO", "id": "BRAZIL_CO", "version": "1.0", "dq": "BR.ABANDONOEFINICIAIS_T.ISCED11_3" } } ] } } ] } }
```

Geography brazil.geo.json

The technology

- Based on well know, widely spread open-source tools and libraries
- Developed using Python and Pandas
- The visualization engine is based on Plotly-Dash (<https://plotly.com/>)
- Easily extensible to add more chart types (<https://plotly.com/python/>)



Next steps

- Json is quite easy to understand but we need a more user-friendly interface to configure the dashboard
- Consider SDMX annotations when rendering the blocks

Summary

- An easily extensible engine that “understands” SDMX and renders charts and maps
- Fast to define
- Low maintenance as data is pulled in real-time
- Can live as a stand-alone component or embedded in a “Hosting” page
- Based on well known technologies