

PxWeb2 Under the hood

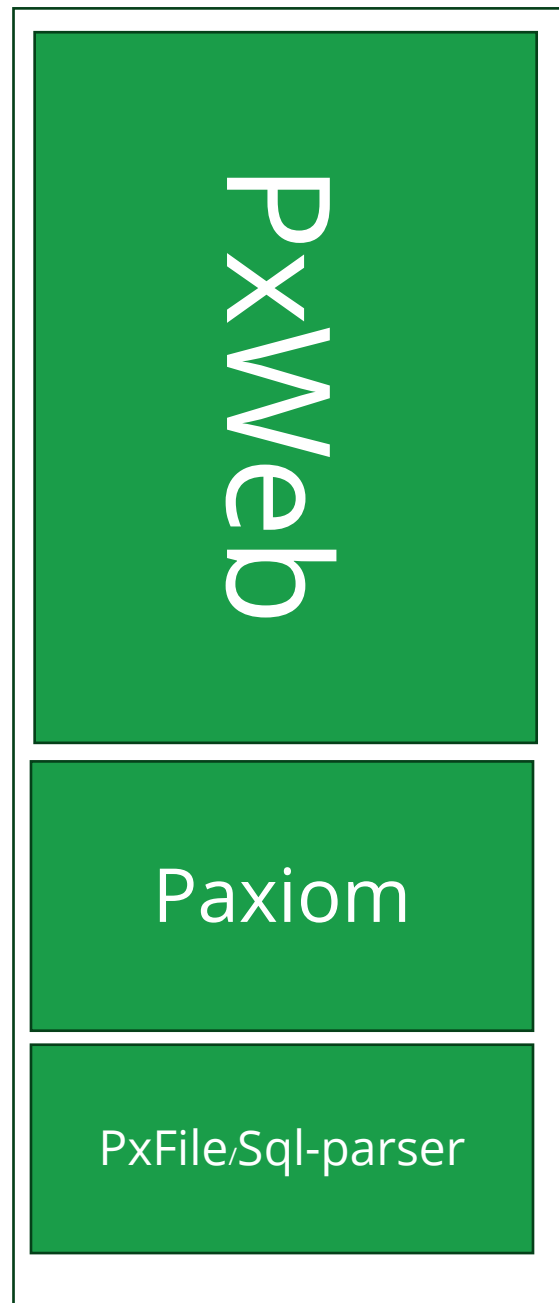
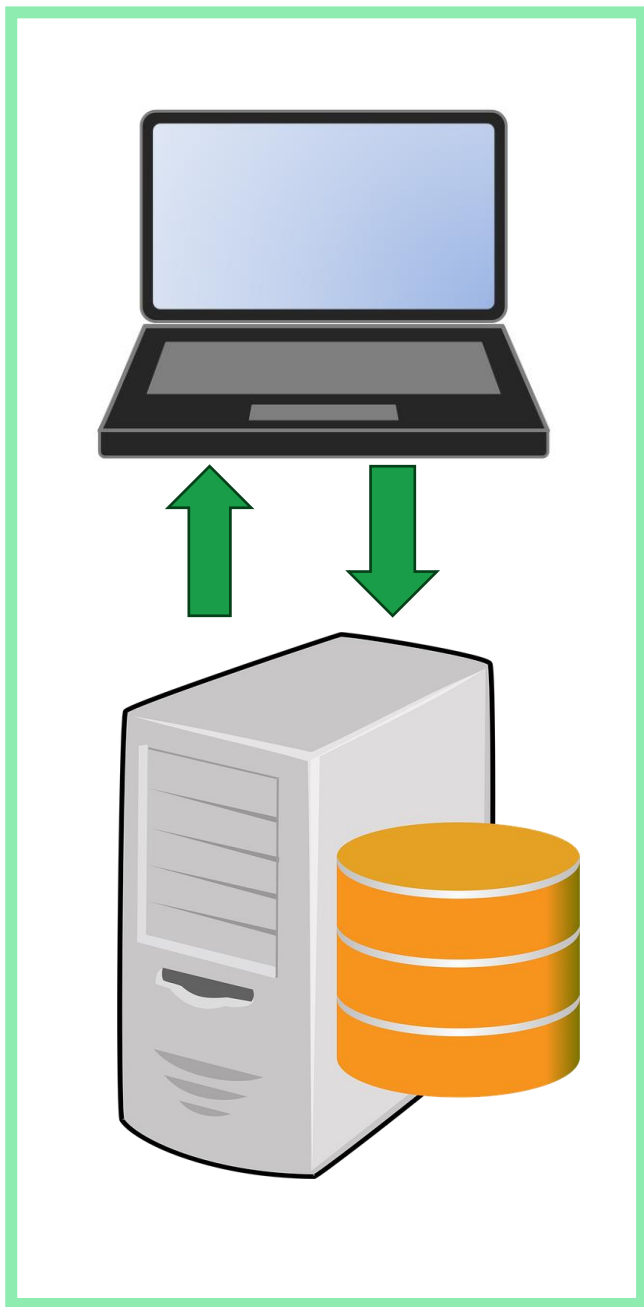
PER INGE VAAJE DEVELOPER STATISTICS NORWAY



Statistisk sentralbyrå
Statistics Norway



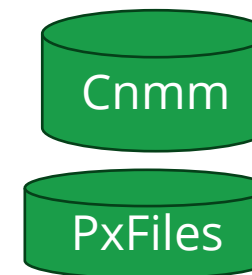
Statistisk sentralbyrå
Statistics Norway



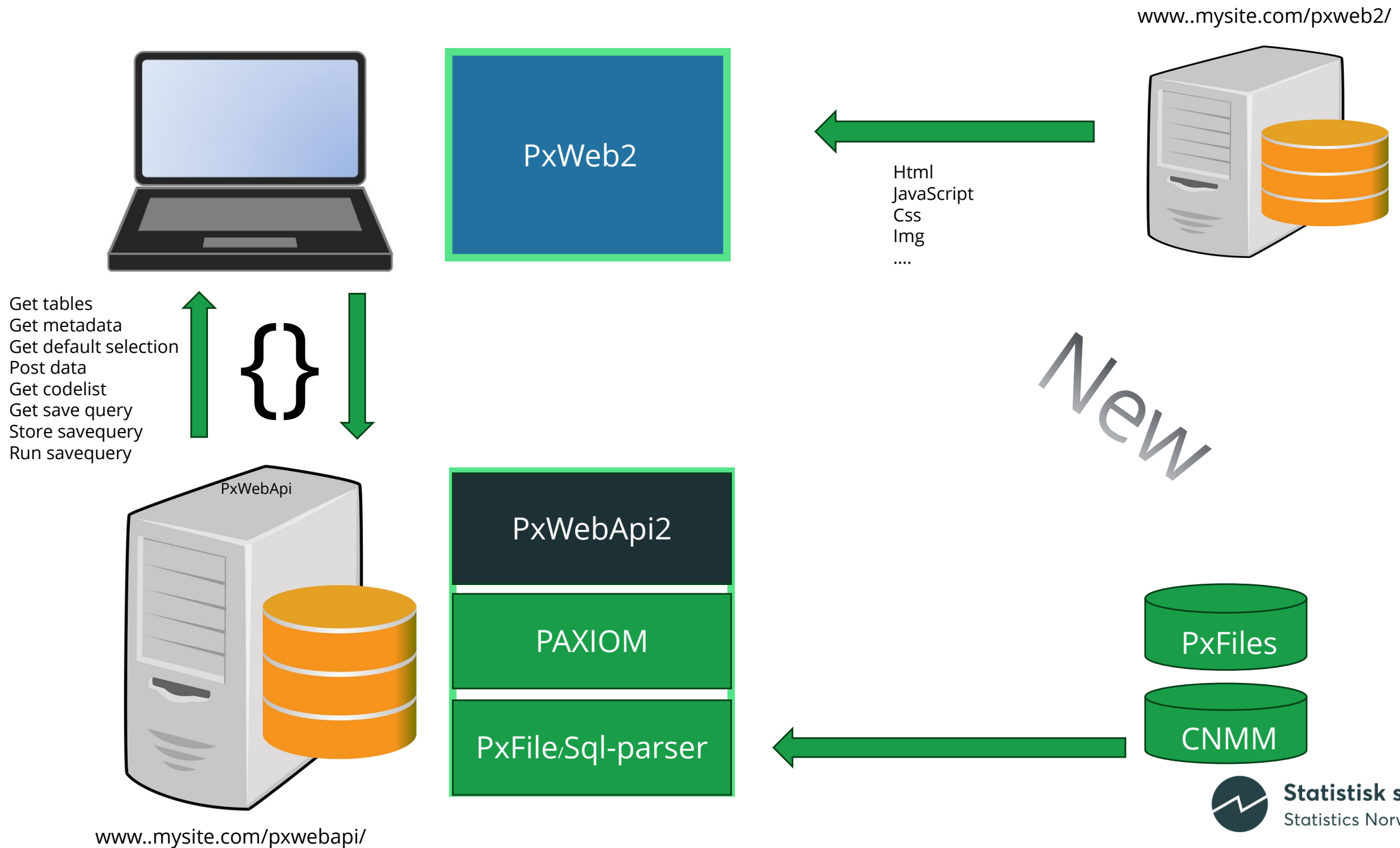
ASP.NET



Old PxWeb



Statistisk sentralbyrå
Statistics Norway



Organisation of the project code

- Stored on GitHub github.com/PxTools/PxWeb2
- Organized as a monorepo (npm workspaces)
- 3 projects
 - PxWeb2 - the application
 - PxWeb2-ui - UI components to be used in the application
 - PxWeb2-api-client - used for api calls, generated from PxWebApi2 specification



PxWeb2 – key information

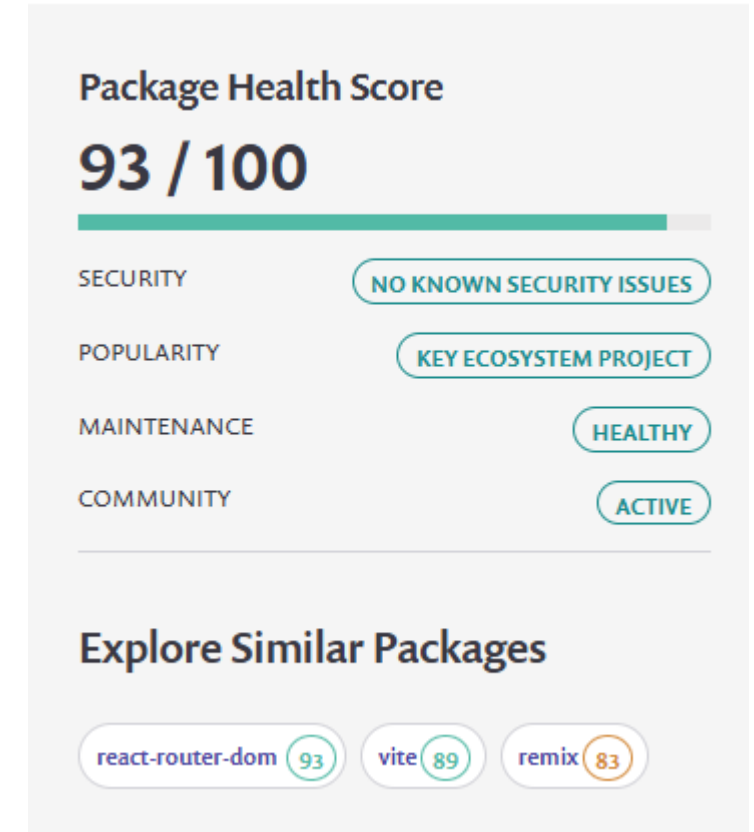
- It's a React application written in Typescript
- Component written as Function Components
- Runs entirely on the client side
- Communicates with PxWebApi2
- Retrieves data from PxFiles or the database via the API
- Some functionality is handled by PxWeb, while other parts are handled by the API
- For example, pivoting is done on the client side, whereas file serialization is handled by the API



Use of external packages

We have tried to limit the use of external packages, but we are using some, for example:

- **React-router** for handling client-side routing (Data mode)
- **i18next** for handling localization
- **Virtuoso** for handling virtualisation of value display in variableboxes
- **Style Dictionary** – handling styling



We check the external packages using **Snyk Advisor** before implement them

Start page

Welcome to PxWeb 2.0

Looking for the perfect table? Use the search field and filters to dig into the numbers you need. Whether you're hunting for trends, facts, or just an oddly satisfying dataset, PxWeb 2.0 has your back.

More about PxWeb

Search in PxWeb 2.0

Search for table names or variables

Filter

3,147 tables

Topic

Year

Time period

Variable

Trends in volume and value of exports and imports of goods, change in percent. Month 2015M01-2025M07

2015-2025 Month Updated 9/26/2025 TAB6006

Imports and exports of goods by trading partner and commodity groups according to SITC rev3/rev4. Not adjusted for non response, confidential data excluded. Month 1995M01-2025M07

1995-2025 Month Updated 9/26/2025 TAB3198

Imports and exports of goods. Total values by trading partner, adjusted for non response. Month 1998M01-2025M07

1998-2025 Month Updated 9/26/2025 TAB3196

Filtering done completely on the client

React-router
navigate to
table page

Table page

<https://api.scb.se/OV0104/v2beta/api/v2/tables?lang=en&includeDiscontinued=true&pageNumber=1&pageSize=10000>

{ } All tables

PxWebApi2



Statistisk sentralbyrå
Statistics Norway

Table page initial

The screenshot shows the PxWeb API interface. On the left, a 'Filter' sidebar is visible with a 'Region' section containing a list of municipalities (0114 Upplands Väsby, 0115 Vallentuna, 0117 Österåker, 0120 Värmdö, 0123 Järfälla, 0125 Ekerö) and a 'Marital status' section. The main content area displays a table titled 'Population by region, observations, year and sex' with columns for region, year (2024), and sex (men, women). A message box indicates 'There are 16 important notes for your selection'.

	Population	
	men	women
0114 Upplands Väsby	25,395	24,928
0115 Vallentuna	17,778	17,341
0117 Österåker	25,180	24,607
0120 Värmdö	23,442	23,193

Get metadata

<https://api.scb.se/OV0104/v2beta/api/v2/tables/TAB1651/metadata?lang=en&defaultSelection=true>

{json-stat2} metadata for the default code list

Get default selection

<https://api.scb.se/OV0104/v2beta/api/v2/tables/TAB1651/defaultselection?lang=en>

{selection}

Get data (POST) empty selection payload

<https://api.scb.se/OV0104/v2beta/api/v2/tables/TAB1651/data?lang=en&outputFormat=json-stat2>

{json-stat2}

PxWebApi2



Statistisk sentralbyrå
Statistics Norway

Table page - Storing of data and metadata

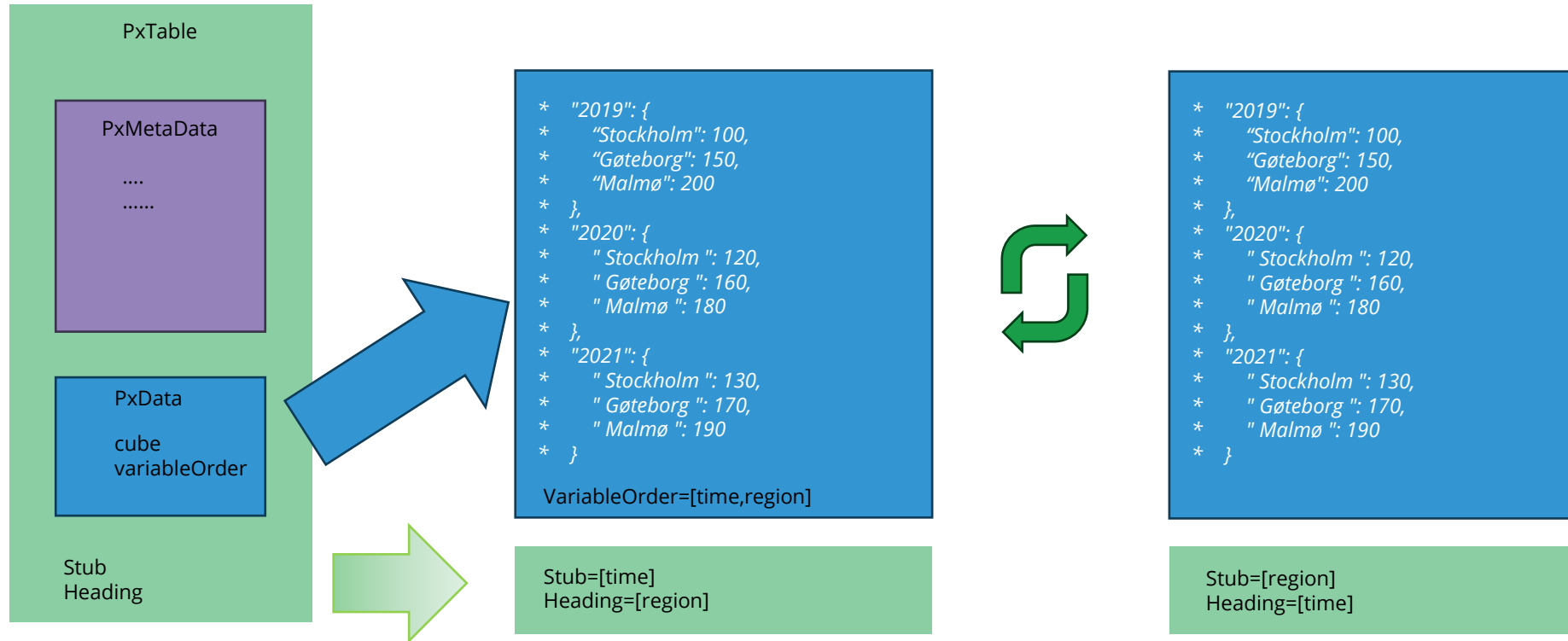


Table page – selecting values

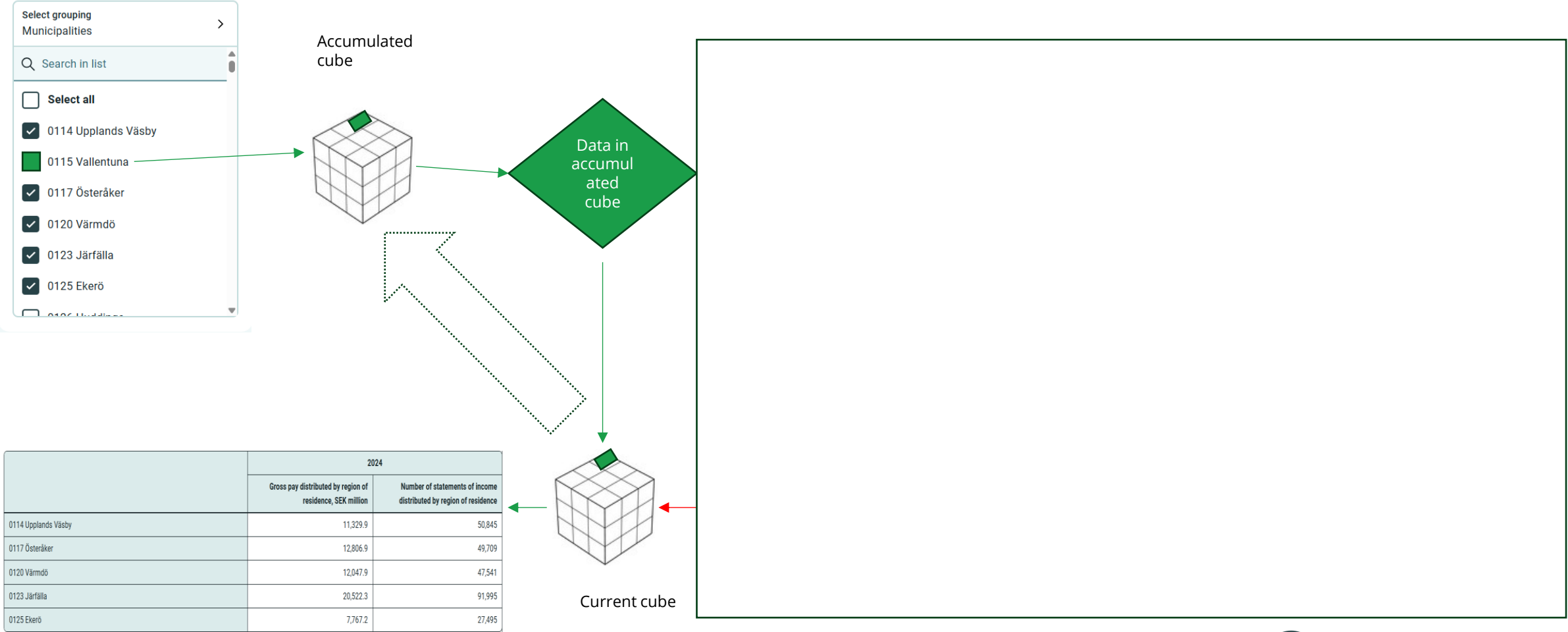


Table page – save to file



Filter



Display



Edit



Save



Help

Språk/Lang

Save

< Hide

Download as file

- Excel (.xlsx)
- Semicolon-delimited with heading (.csv)
- PC-Axis (.px)
- JSON-stat2 (.json)
- HTML (.html)
- Parquet (.parquet)

More file formats are in the works.

1968-2024

Population by region, observations, year and sex

Information

Last updated: 2/21/2025, 8:00 AM

There are 16 important notes for your selection

Click on this message to read the notes.

	Population	
	2024	
	men	women
0114 Upplands Väsby	25,395	24,928

<https://api.scb.se/OV0104/v2beta/api/v2/tables/tab638/data?lang=en&outputFormat=xlsx&outputFormatParams=IncludeTitle>

PxwebApi

Serializers



Statistisk sentralbyrå
Statistics Norway

Table page – saved query

HTML (.html)

Parquet (.parquet)

More file formats are in the works.

Link to updated table

You get a unique link to your table, that we keep updated for you. How new time periods are added is up to you.

Options for new time periods

☐ Don't add new ones (the table will only show the ones you've selected now)

☐ Add new ones (they will be added to the ones you've selected now)

☒ Add new ones, but keep the same number (when a new time period is added, the oldest one is removed)

✓ Link copied

<https://pxweb2.pages.dev/en/table/tab638?sq=500253>

API query

g to help you find and use the numbers

Språk/Language

ber of inhabitants > Popul... Show more

rvations, year and

AM

from Uppsala to Västmanland →
have the current municipal...

Population	
2024	
men	women
25,395	24,928

je

Filter

Display

Edit

Save

Help

<https://api.scb.se/OV0104/v2beta/api/v2/savedqueries>

{selection}

500253

Run the query from the API

<https://api.scb.se/OV0104/v2beta/api/v2/savedqueries/500253/data?outputformat=xlsx>

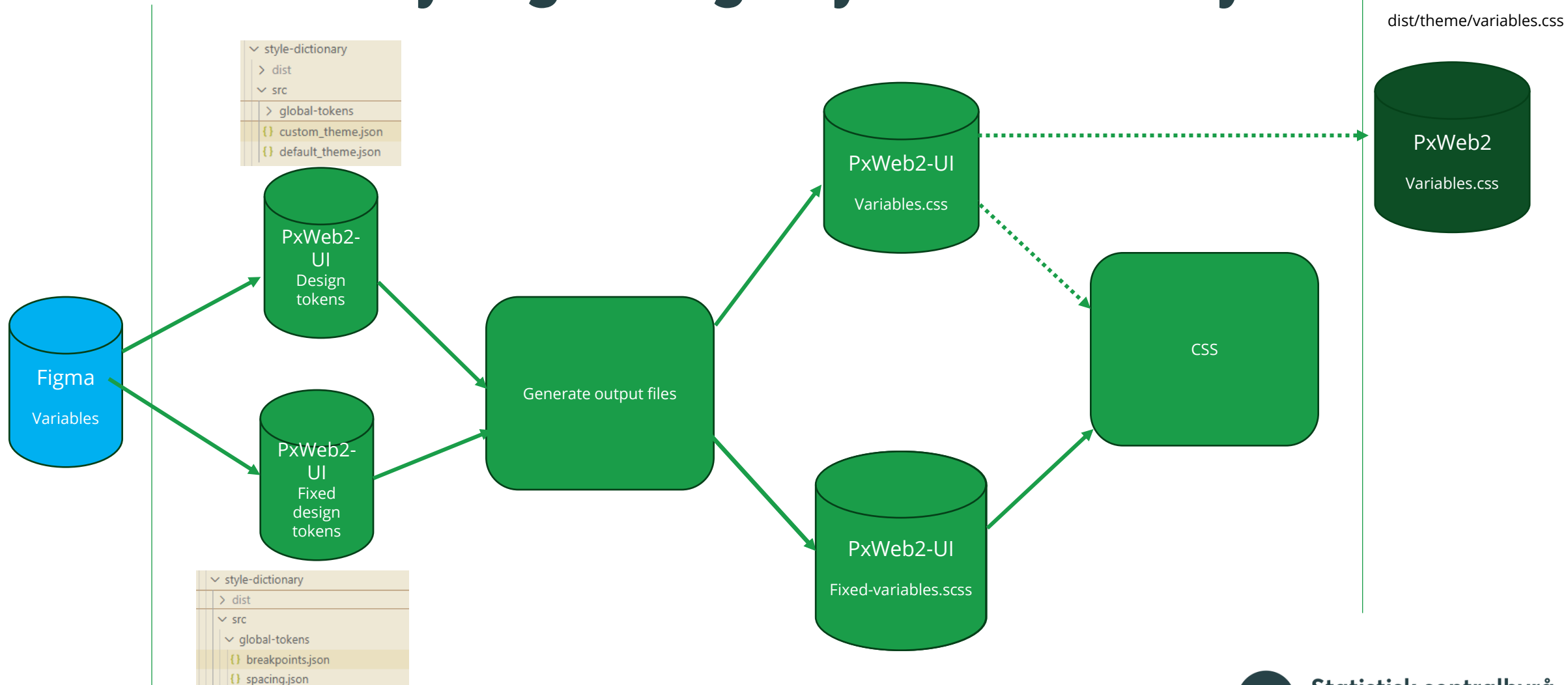
PxwebApi2

File or database



Statistisk sentralbyrå
Statistics Norway

Styling using Style Dictionary

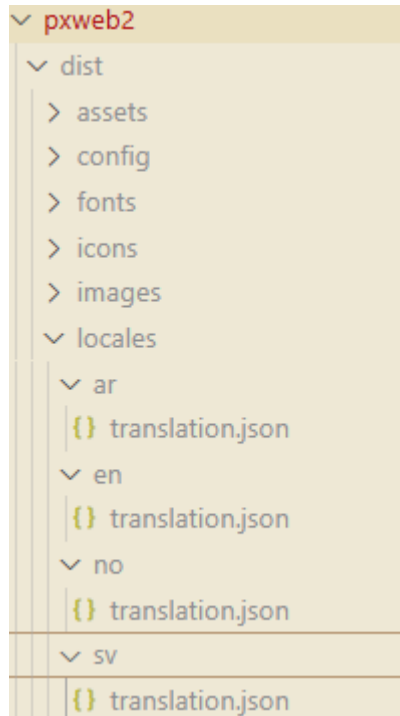


Localization

We use **i18next** for localization

Supported languages are defined in the config file

- Language files are better structured than in the old PxWeb



```
"meta": {
  "languageName": "English",
  "shorthand": "en"
},
"common": {
  "title": "PxWeb 2.0",
  "header": {
    "logo": "PxWeb 2.0",
    "logo_alt": "To the front page",
    "language_selector": "Språk/Language"
  }
},
```

```
{
  "meta": {
    "languageName": "Norsk",
    "shorthand": "no"
  },
  "common": {
    "title": "PxWeb 2.0",
    "header": {
      "logo": "PxWeb 2.0",
      "logo_alt": "Til forsiden",
      "language_selector": "Språk/Language"
    }
  }
}
```

```
language: {
  supportedLanguages: [
    { shorthand: 'en', languageName: 'English' },
    { shorthand: 'sv', languageName: 'Svenska' },
    { shorthand: 'no', languageName: 'Norsk' },
  ],
  defaultLanguage: 'en',
  fallbackLanguage: 'en',
  showDefaultLanguageInPath: true,
},
```

Use in a component

```
import { useTranslation } from 'react-i18next';

const { t } = useTranslation();

return (
  <img
    className={cl(styles.logo)}
    src={srcPath}
    alt={t('common.header.logo_alt')}
  />
);
```



Statistisk sentralbyrå
Statistics Norway

Performance

We have taken several steps to improve performance.

For example:

- Concurrent API fetches for metadata, default selections, and data during the initial load of the table page
- Storing fetched data in an accumulated cube
- Using Virtuoso for virtual rendering of values in value boxes

We aim to enhance the performance of table rendering.

Although we attempted to implement Virtuoso, we found it challenging to use with a multidimensional table.

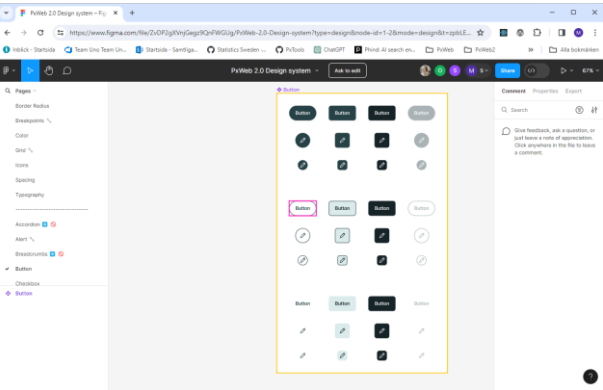


Testing

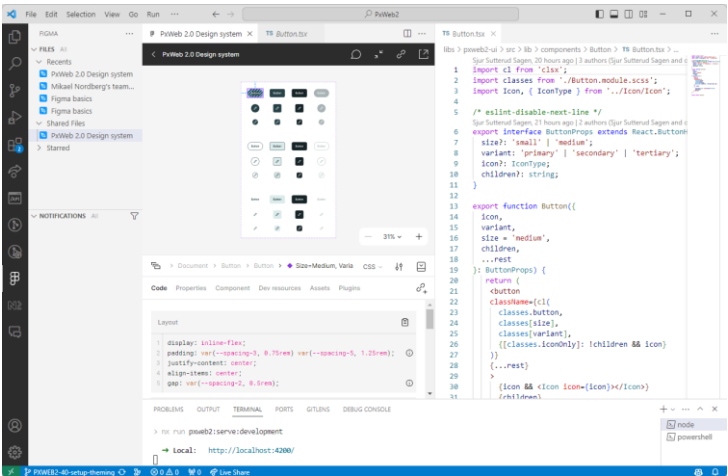
- **Unit tests** (Vitest) on each push to GitHub and pull request to main
- **Mabl**: regression tests on pull requests
- **Chromatic (Storybook)**: visual testing of UI-components by designer
- **Scheduled Mabl tests**: smoke, regression and wcag
- **Manual testing of WGAC-implementation** (AXE)
- **Manual testing** on the feature branch prior to merging into the main branch
- **Code review** is done by other developers before merging into main



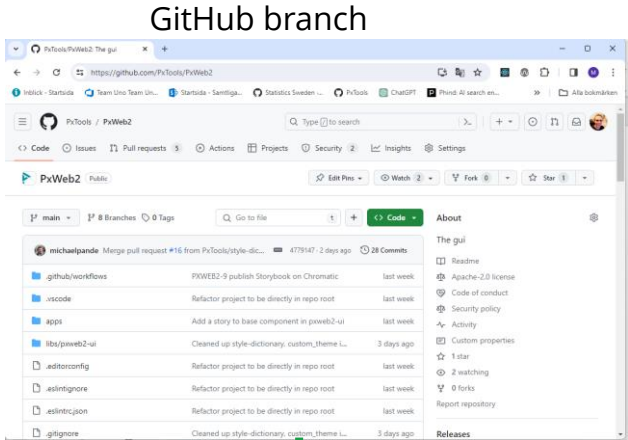
Figma (UX/UI-designer)



VS Code



GitHub

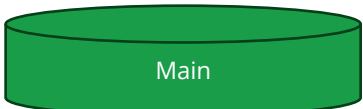


GitHub branch

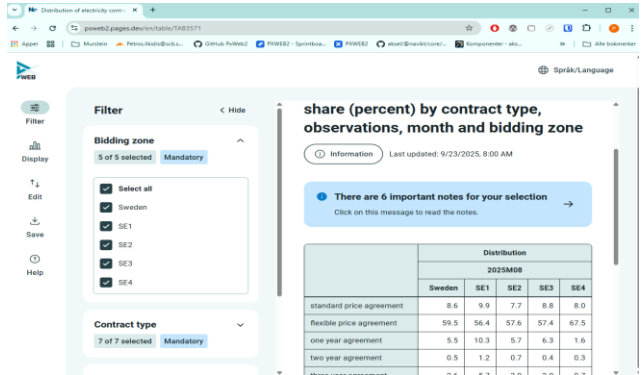
Pull request to main

- Check code (sonarqube,codeql)
- Run tests (mabl regression and smoke)
- Deploy StoryBook to Chromatic (test and accept by Ux-designer)
- Deploy branch to CloudFlare (test and accept by testers and Ux-designer)

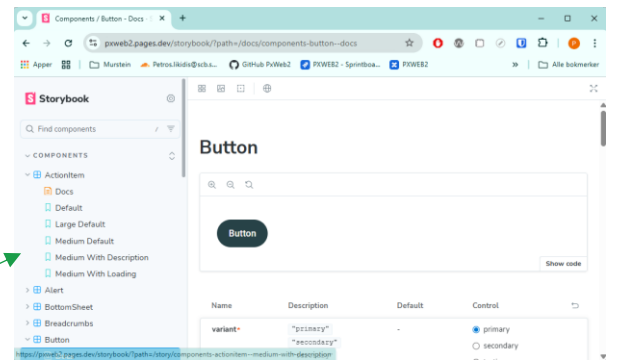
If OK merge to main



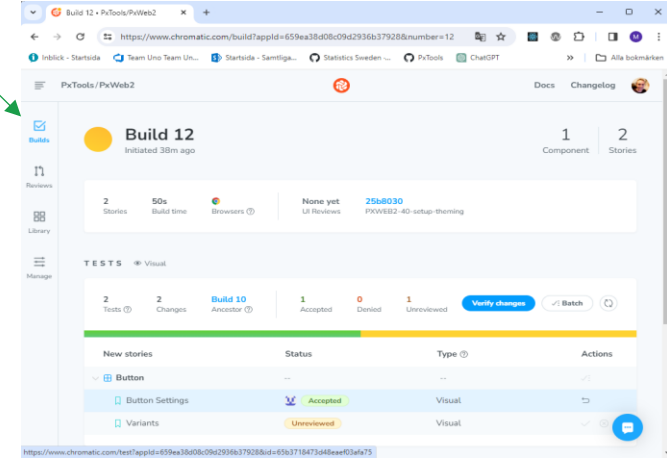
PxWeb on CloudFlare



StoryBook on CloudFlare



StoryBook on Chromatic



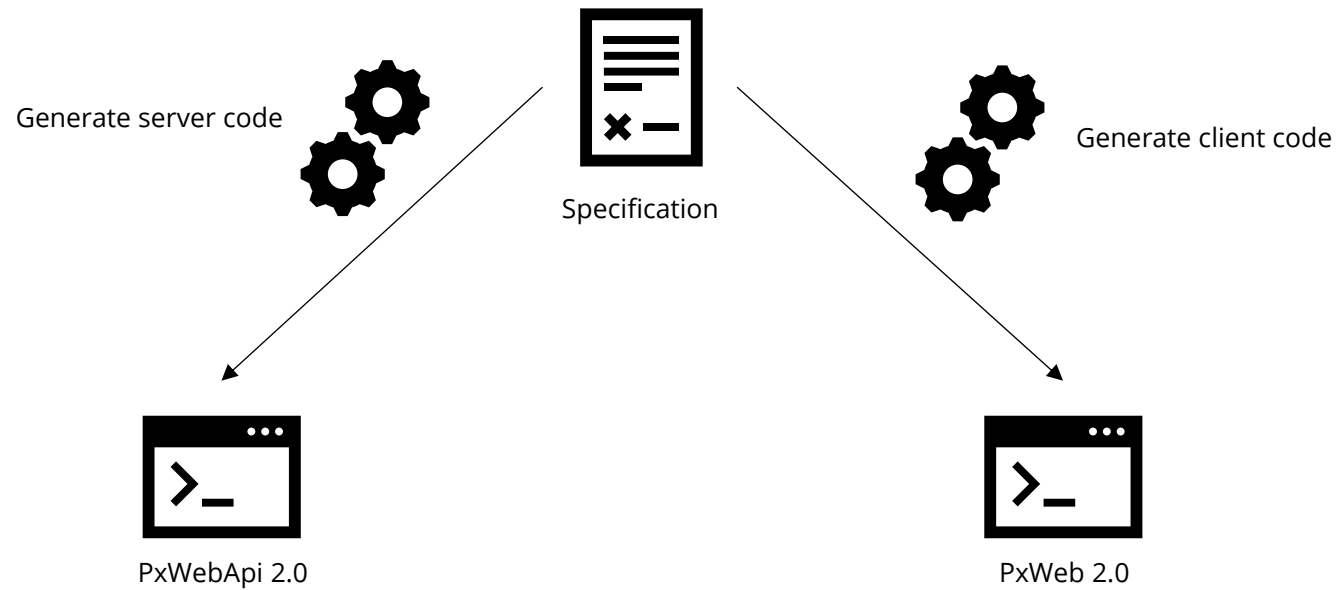
PxWebApi 2.0

Under the hood

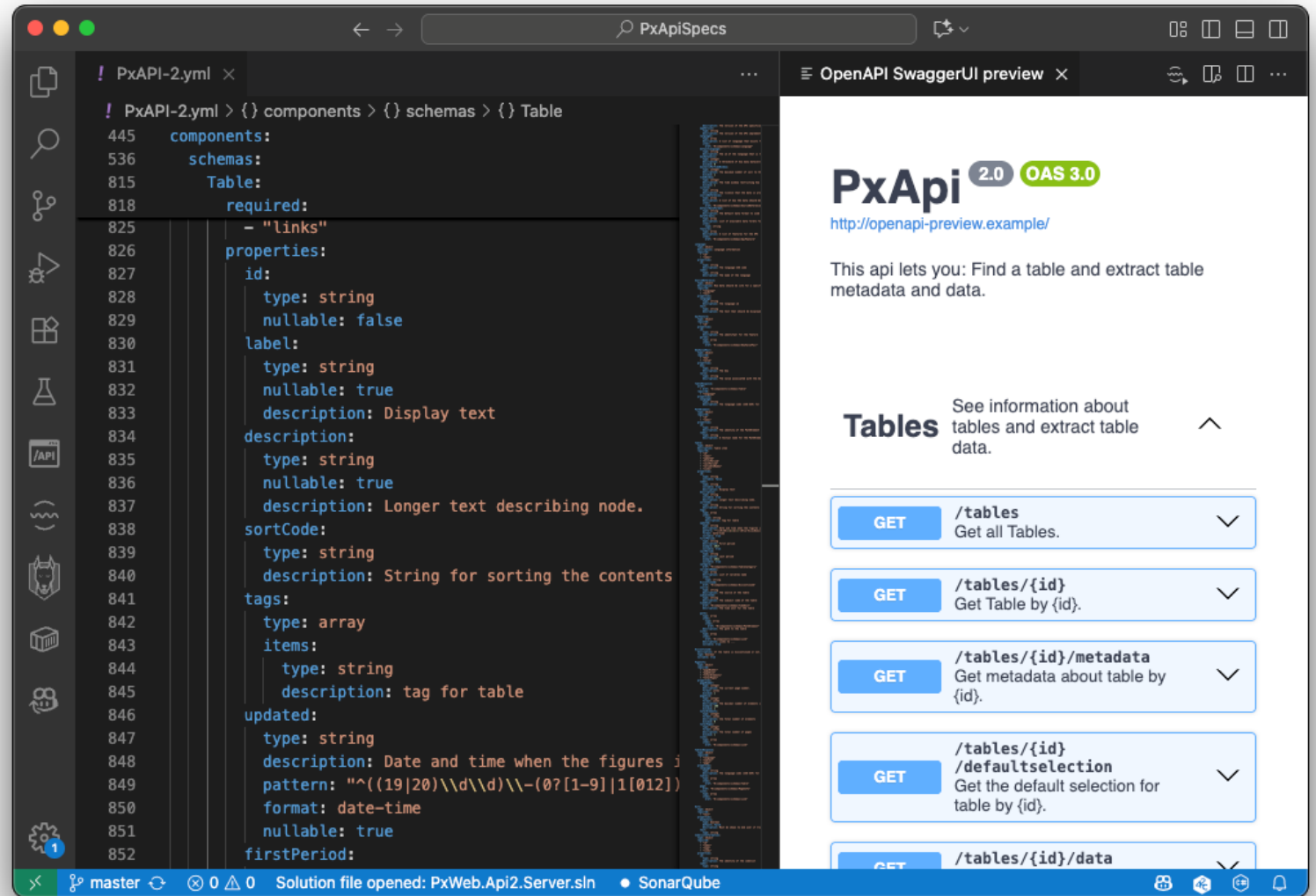
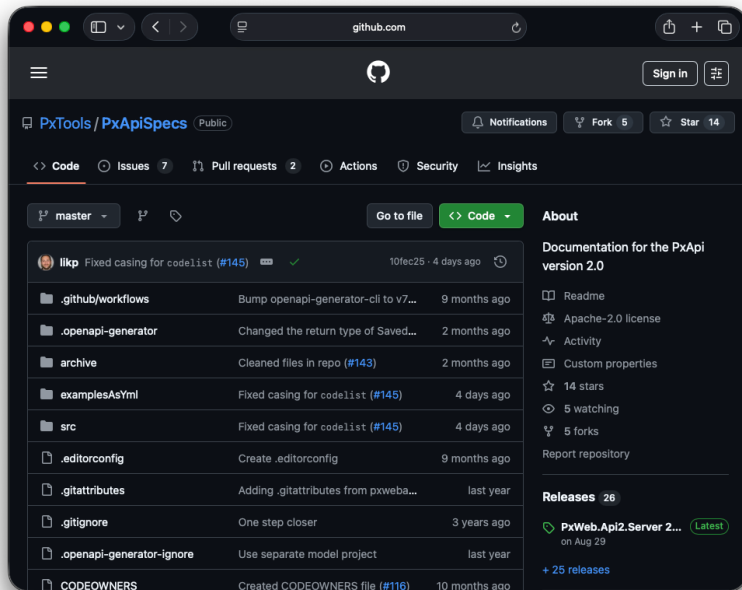
How it was made



How it was made



PxTools/PxApiSpecs



Generate code

- openapi-generator.tech
 - Server: aspnetcore
 - Client: typescript-fetch*



* right now we are still using <https://www.npmjs.com/package/openapi-typescript-codegen>



Statistisk sentralbyrå
Statistics Norway

nuget

[Packages](#)[Upload](#)[Statistics](#)[Documentation](#)[Downloads](#)[Blog](#)[Sign in](#)

pxweb.api2

Advanced search filters

2 packages returned for pxweb.api2

Sort by Relevance

PxWeb.Api2.Server by: pc-axis

.NET 8.0

19,633 total downloads last updated a month ago Latest version: 2.0.0

PX

Server library for PxWeb API 2.0

PxWeb.Api2.Server.Models by: pc-axis

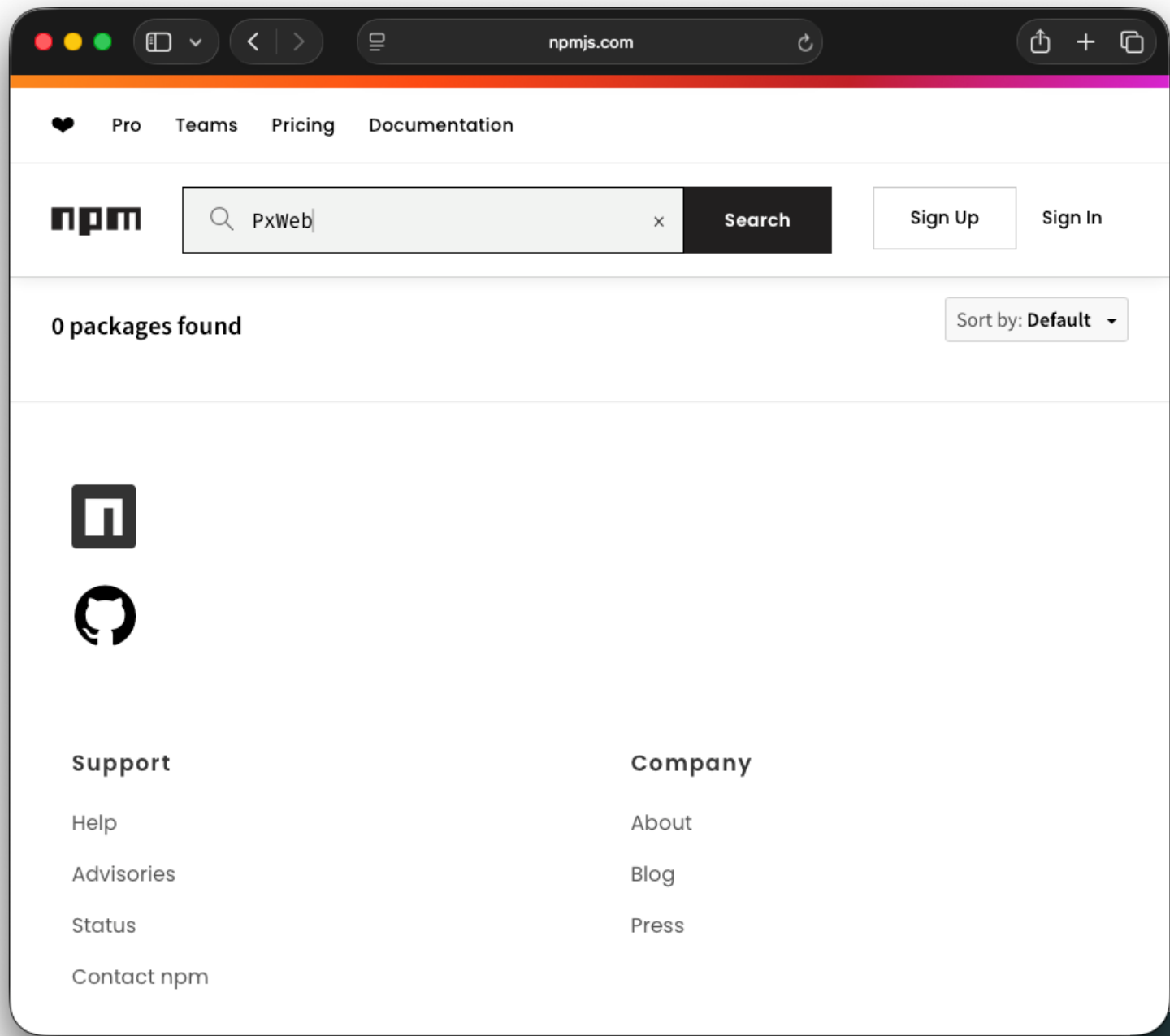
.NET 5.0.NET Core 2.0.NET Standard 2.0.NET Framework 4.6.1

15,188 total downloads last updated a month ago Latest version: 2.0.0

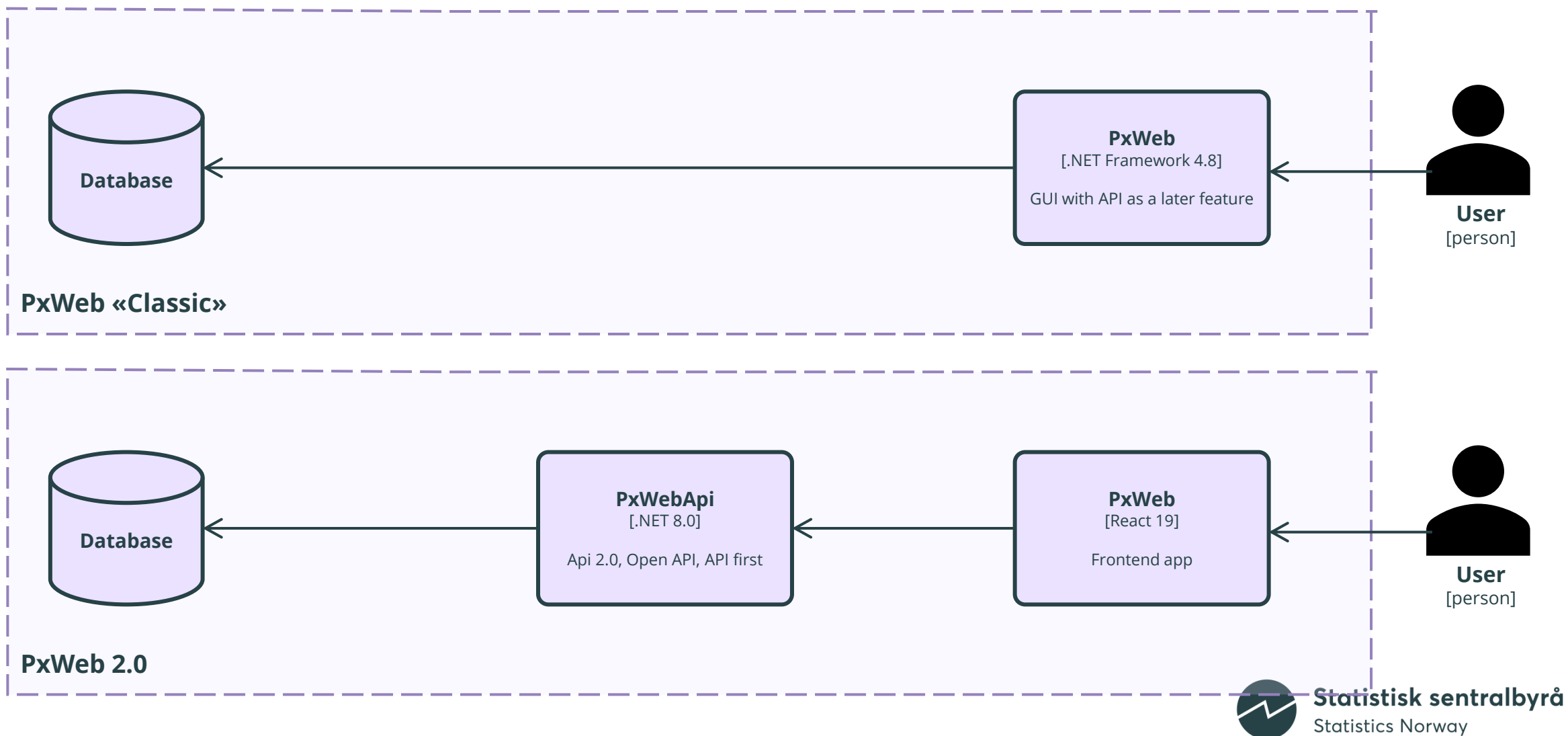
PX

Server library for PxWeb API 2.0

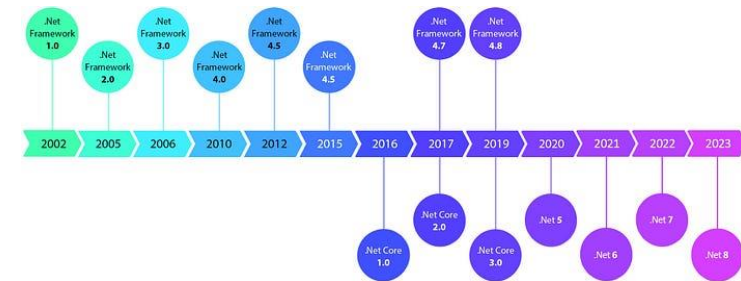




PxWeb «Classic» vs 2.0

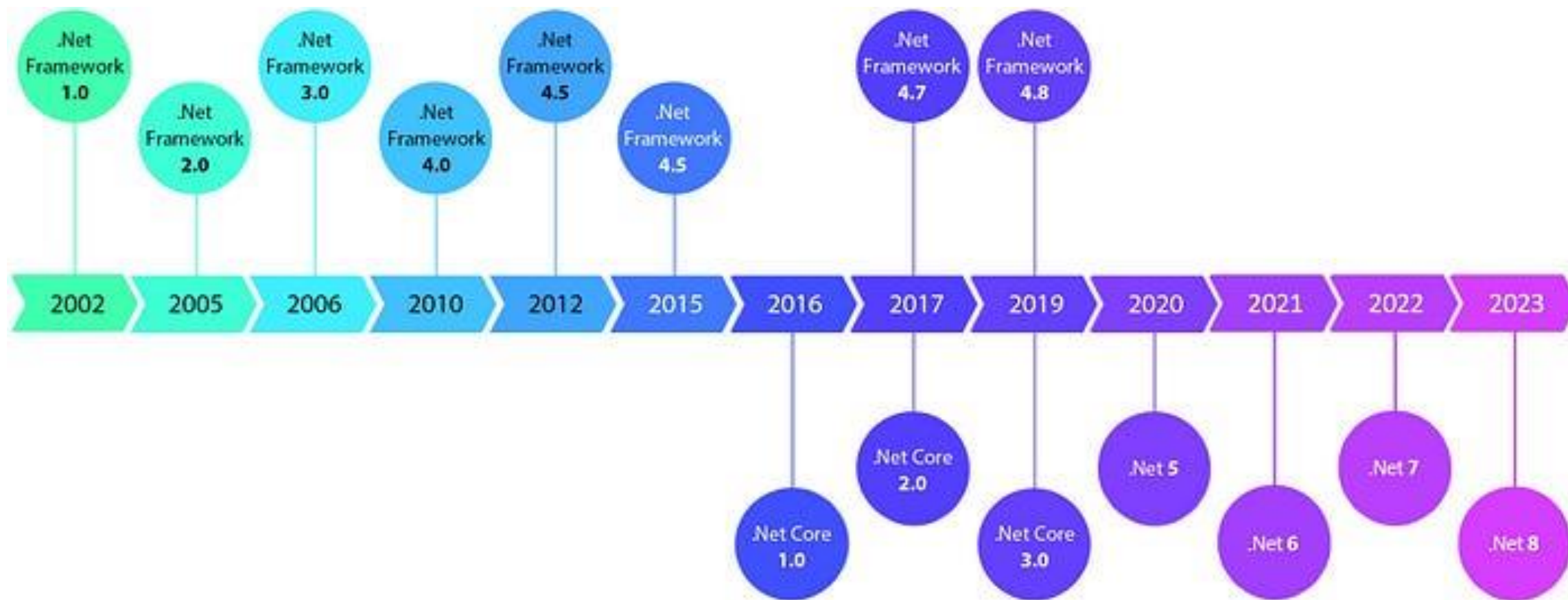


PxWeb «Classic» vs 2.0



	Classic	2.0
Database	PX, CNMM	PX, CNMM
API	.NET Framework 4.8 C#	.NET 8.0 C#
GUI	.NET Framework 4.8 ASP.NET Web Forms C#	React TypeScript
API spesification	-	OpenAPI
Plattforms	Windows	Linux, macOS, Windows





Libraries in .NET Standard 2.0

- PCAxis.Core
- PCAxis.Sql
- PCAxis.Serializers
- PCAxis.Menu
- ...

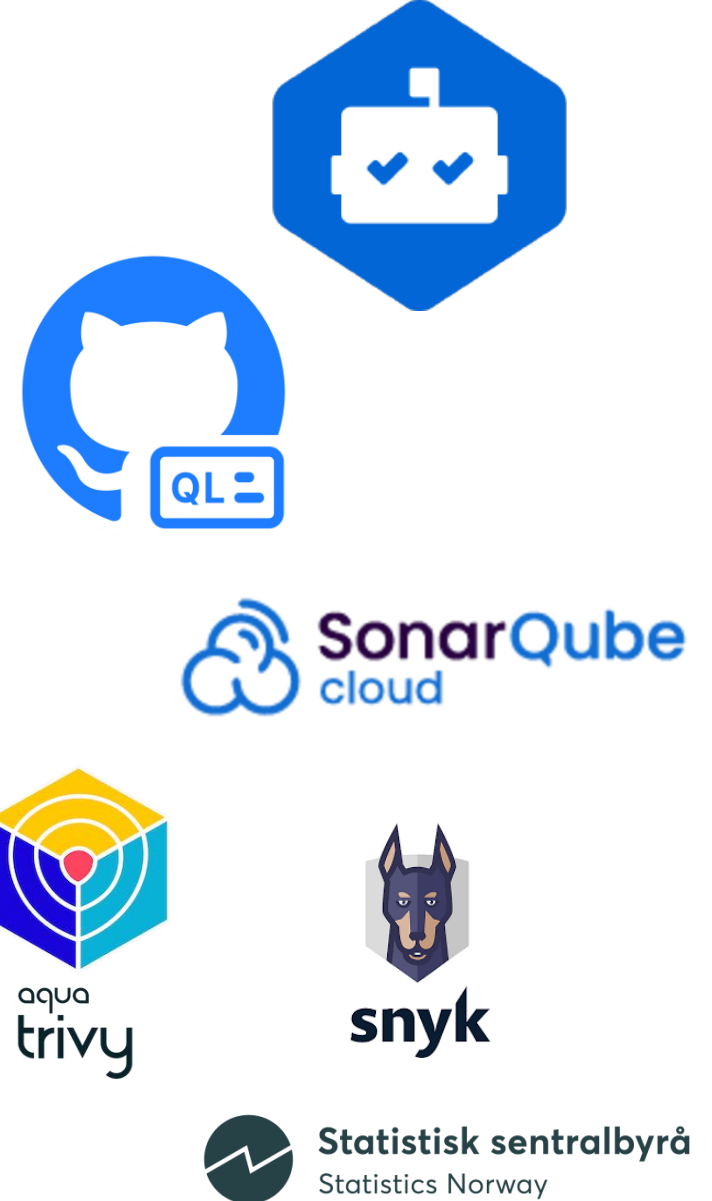
Version: .NET Standard 2.0 Available APIs: 32,638 of 37,118

.NET Implementation	Version Support
.NET and .NET Core	✗ 1.0 ✗ 1.1 ✓ 2.0 ✓ 2.1 ✓ 2.2 ✓ 3.0 ✓ 3.1 ✓ 5.0 ✓ 6.0 ✓ 7.0 ✓ 8.0 ✓ 9.0
.NET Framework	✗ 4.5 ✗ 4.5.1 ✗ 4.5.2 ✗ 4.6 ✓ 4.6.1 ✓ 4.6.2 ✓ 4.7 ✓ 4.7.1 ✓ 4.7.2 ✓ 4.8 ✓ 4.8.1
Mono	✗ 4.6 ✓ 5.4 ✓ 6.4
Xamarin.iOS	✗ 10.0 ✓ 10.14 ✓ 12.16
Xamarin.Android	✗ 7.0 ✓ 8.0 ✓ 10.0
Universal Windows Platform	✗ 8.0 ✗ 8.1 ✗ 10.0 ✓ 10.0.16299 ✓ TBD
Unity	✓ 2018.1 ✓ 2021.2

Code Security

- Dependabot security updates
 - Dependabot version updates
- Static code analysis
 - CodeQL (GitHub)
 - SonarQube Cloud
- Trivy container image scanning
- Snyc Advisor
- HTTP Security Response Headers
 - <https://developer.mozilla.org/en-US/observatory>,
<https://securityheaders.com/>

- Pipelines (GitHub Action workflows)
- IDE (Visual Studio Code)



Thank you!

