

EasyCharts: HTML Chart Elements with Web Components

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Agenda

- Motivation
- Custom Web Components
- Properties of Charts
- Bar Chart
- Line Chart
- Styling with CSS
- For Developers

Motivation

- Creating SVG charts in HTML often requires many dependencies.
- Complex installation processes.
- Bloated libraries.
- Sometimes even comes with costs.
- Imagine a way only including a file to create CSS customizable SVG charts in HTML.
- Let's introduce you to EasyCharts.

Custom Web Components

- Possibility to create custom web components.
- 2 Types:
 - Customized built-in elements: Components that inherit from standard HTML elements.
 - Autonomous custom elements: Standalone implementations, they don't inherit from standard HTML.
- `customElements.define('ec-barchart', BarChart);`
- Different life-cycle callbacks.
- Focus on creating chart components using D3.
- Customization with CSS possible.

Properties of Charts

- Different input modes: Data series and HTML table.
- Handling custom errors (e.g. data series missing).
- CSS available for styling elements of created chart, using HTML `class` attribute and HTML `id` attribute.
- Add x and y axis titles.
- Add chart titles.
- Scaling x and y axis.
- Labelling bars and lines.

Data Series Mode

- Manually parsing the data series.
- Each data series has to have a name, else error thrown.
- Data stored in data point and is separated with comma.

```
<ec-linechart>
```

```
  <dataseries name="dataseries1">
```

```
    <datapoint> 1960,3.03 </datapoint>
```

```
    <datapoint> 1970,3.7 </datapoint>
```

```
    <datapoint> 1980,4.43 </datapoint>
```

```
    <datapoint> 1990,5.28 </datapoint>
```

```
    <datapoint> 2000,6.08 </datapoint>
```

```
    <datapoint> 2010,6.87 </datapoint>
```

```
  </dataseries>
```

```
</ec-linechart>
```

Table Mode

- Input in standard HTML table format.
- `<thead>` has to exist and has to have a `<tr>`.
- `<th>` in `<tr>` represents a data series.

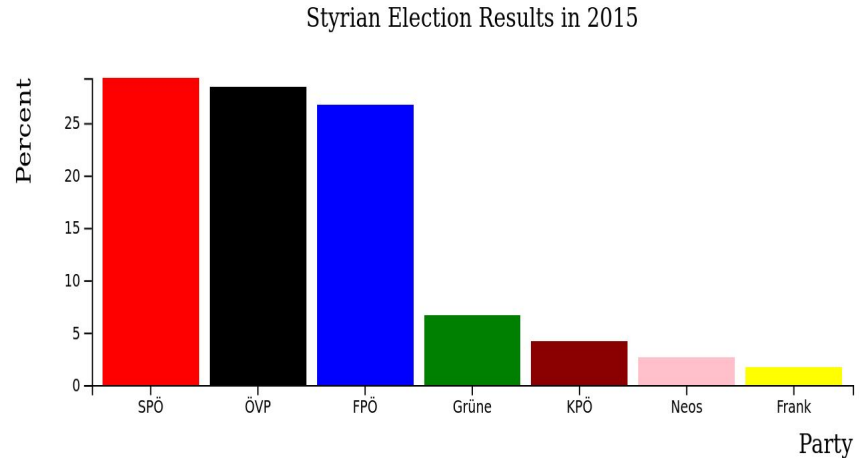
```
<ec-barchart>  
  <table>  
    <thead>  
      <tr>  
        <th>Party Results</th>  
      </tr>  
    </thead>  
    <tbody>  
      <tr>  
        <td>SPÖ</td>  
        <td>29.29</td>  
      </tr>  
      [...]   
    </tbody>  
  </table>  
</ec-barchart>
```

Bar Chart

- Single data series bar chart implementation.
- Input possible with data series and HTML table.
- Add color for each bar using `id` or `class` in `<datapoint>`, or in `<td>` element of `<tbody>`.

Bar Chart Example: Table

```
<ec-barchart id="barchart1">
  <table>
    <thead>
      <tr>
        <th>Party Results</th>
      </tr>
    </thead>
    <tbody>
      <tr>
        <td id="spoe">SPÖ</td>
        <td>29.29</td>
      </tr>
    </tbody>
  </table>
</ec-barchart>
```

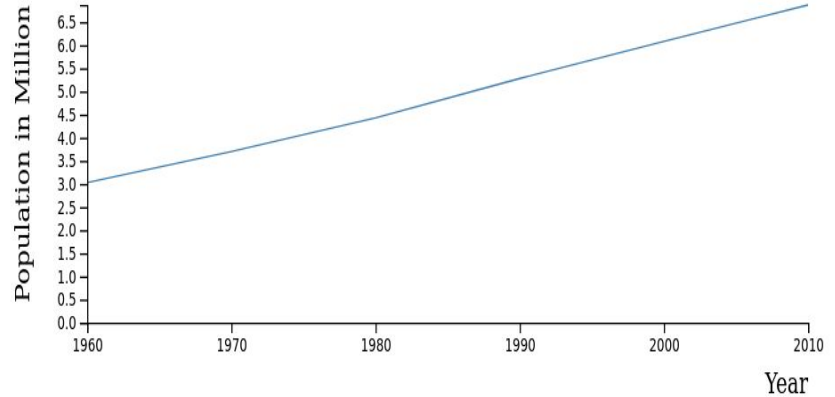


Line Chart

- Line chart possible with single data series and multiple data series (multiline chart).
- Input possible with data series and HTML table.
- Add color for each line using `id` or `class` in `<dataseries>`, or in `<th>` element of `<thead>`.

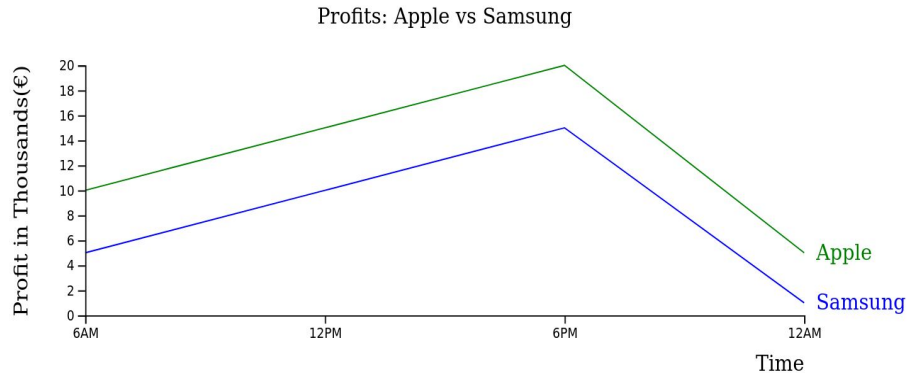
Linechart Example

```
<ec-linechart class="linechart">  
  <x-axis-title>Year</x-axis-title>  
  <y-axis-title>Population in Million</y-axis-title>  
  <dataseries name="dataseries1"  
  id="dataseries1">  
    <datapoint> 1960,3.03 </datapoint>  
    <datapoint> 1970,3.7 </datapoint>  
    <datapoint> 1980,4.43 </datapoint>  
    <datapoint> 1990,5.28 </datapoint>  
    <datapoint> 2000,6.08 </datapoint>  
    <datapoint> 2010,6.87 </datapoint>  
  </dataseries>  
</ec-linechart>
```



Multiline Chart Example

```
<ec-linechart id="mlinechart1">
  <x-axis-title>Time</x-axis-title>
  <y-axis-title>Profit in Thousands(€)</y-axis-title>
  <dataseries name="SalesTeam"
    id="samsung">
    <datapoint> 6AM,5 </datapoint>
    <datapoint> 12PM,10 </datapoint>
    <datapoint> 6PM,15 </datapoint>
    <datapoint> 12AM,1 </datapoint>
  </dataseries>
  <dataseries name="SumOfSales"
    id="apple">
    <datapoint> 6AM,10 </datapoint>
    <datapoint> 12PM,15 </datapoint>
    <datapoint> 6PM,20 </datapoint>
    <datapoint> 12AM,5 </datapoint>
  </dataseries>
</ec-linechart>
```



Live Demo

Styling With CSS

- Change width and height using CSS through the `class` or `id` attribute.
- Change line color of line chart.
- Change bar color of bar chart.
- Flag if ticks on x axis are displayed.
- External CSS only possible using a server, else only inline CSS possible.

CSS Examples

- Change width of bar and line chart.

```
#barchart1 {  
  --chart-width: 1000;  
  --chart-height: 300;  
}  
[...]  
<ec-barchart id="barchart1">
```

CSS Examples

- Change line color of line chart, or bar color of bar chart.

```
#spoe {  
    --color: red;  
}  
[...]  
<datapoint id="spoe">
```


CSS Examples

- If ticks == true then show ticks on the x axis, else do not show them.

```
.linechart {  
    --show-ticks: false;  
}  
[...]  
<ec-linechart class="linechart">
```

For Developers

Project Structure

- `gulpfile.mjs`: Building the project and creating the `dist/` directory.
- `rollup.config.mjs`: Bundling D3 dependency with the `easycharts.mts` file and transpiling to `easycharts.js`.
- `src/`
 - Source code
- `dist/`
 - `easycharts.js`
 - `examples/`

Build Process

- For developing Node.js version $\geq v14.18.1$ needed.
- Build automated using gulp and rollup.
- Creating server in default gulp task, which is necessary for the external CSS files.

```
> npm install
```

```
> npx gulp
```

Live Demo

Resources

- Our GitHub: <https://github.com/dorianpercic/EasyCharts>
- Custom Web Components:
https://developer.mozilla.org/en-US/docs/Web/API/Web_components/Using_custom_elements
- Pie Chart:
<https://dev.to/dannyengelman/what-web-technologies-are-required-to-draw-a-pie-chart-in-2021-spoiler-alert-a-standard-web-component-will-do-1j56>

Thank You! Any Questions?