

A Graphical Tool for Viewing and Interacting with a Control System

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Abstract

We present a graphical interface ("synoptic") for displaying status information and enabling user interaction with the Tango based control system for the MAX IV synchrotron. It focuses on bringing an intuitive view of the whole system, so that operators can quickly access the controls for any hardware based on its physical location.

The view is structured into different layers that can be selectively shown, and various live updated information can be displayed in the form of e.g. color or text. Panning and zooming is supported, as well as invoking commands. The interface is defined by an SVG drawing which can be edited without programming expertise.

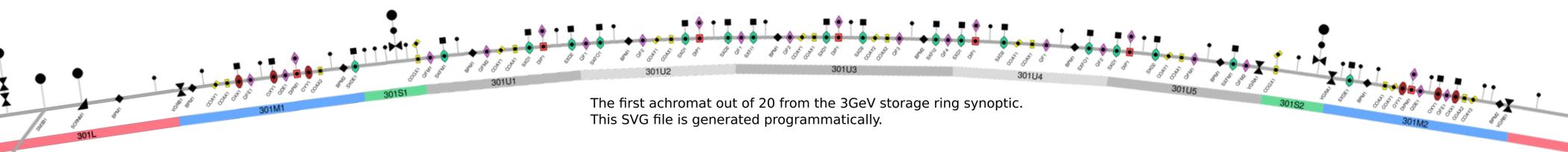
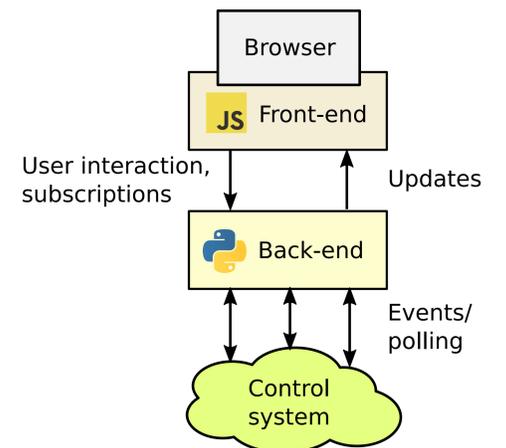
Since our system is based on modern web technologies, it can be run as a web service accessible by standard browsers, but it can also be integrated in GUI applications.

Project goals

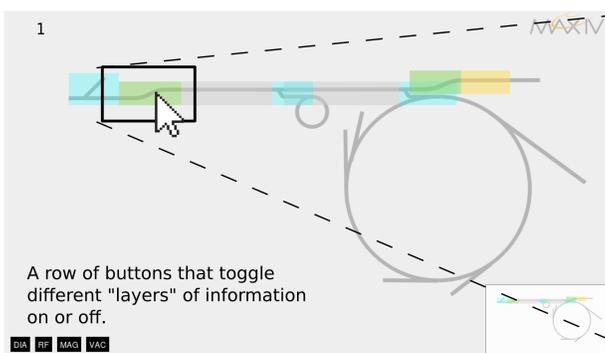
- A user friendly view of the control system
- Immediate access to important information
- A quick way to launch specific GUIs



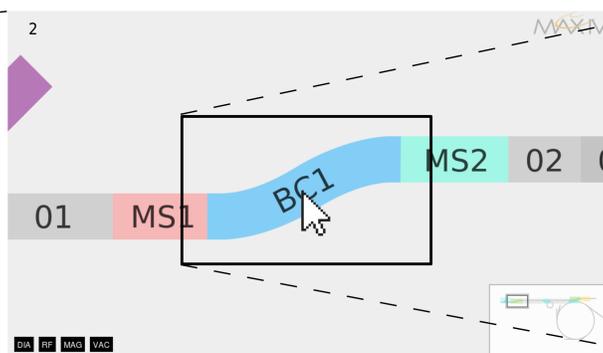
Architecture



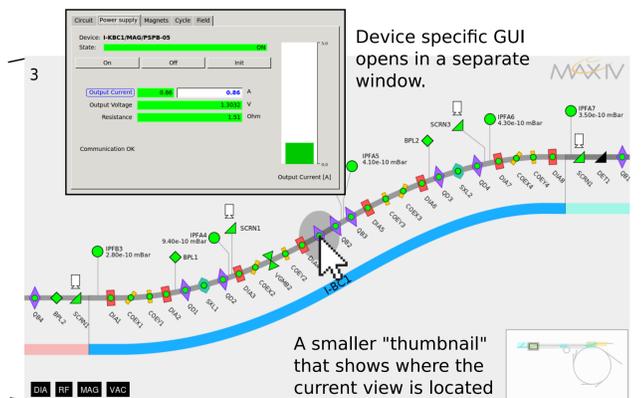
The first achromat out of 20 from the 3GeV storage ring synoptic. This SVG file is generated programmatically.



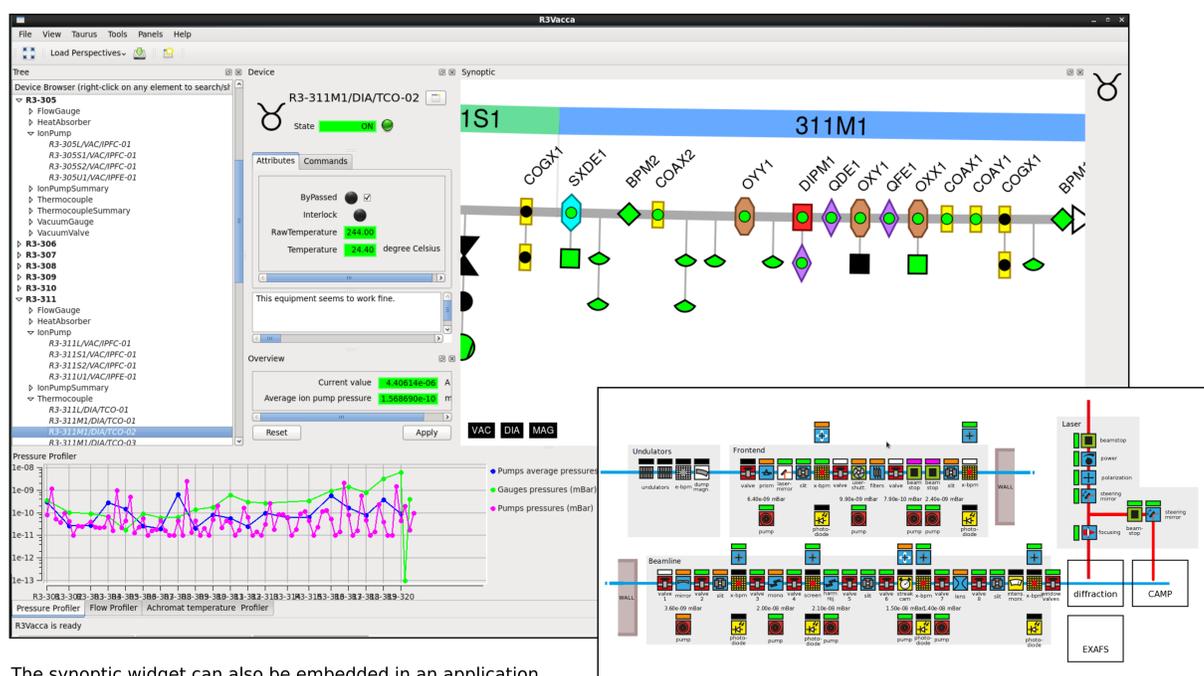
This is the SVG synoptic for the linear accelerator. The user can successively zoom into the image by clicking different parts, or freely by spinning the mouse wheel



An intermediate detail level where each section of the linear accelerator is shown.



In this detailed view, each object represents a TANGO device. The State of the device is represented by color, and for ion pumps the Pressure attribute is displayed as text. The user can launch specialised panels for interacting with a particular device (here, a magnet).



The synoptic widget can also be embedded in an application (this one specialised for vacuum monitoring of the storage ring) and react to signals such as selecting a device by directly zooming to it.

An example of a SVG synoptic for a single beamline. It is based on an image file supplied by the beamline scientists.

File format

```
<svg>
...
<g>
  <!-- container -->
  <g id="background" class="layer">
    <!-- this layer is always visible -->
    <g class="zoom layer0">
      <!-- least detail -->
      ...
    </g>
    <g class="zoom layer1">
      <!-- more detail -->
      ...
    </g>
    ...
    <g id="Vacuum" class="layer">
      <g class="zoom level1">
        <!-- vacuum equipment -->
        <circle class="pump" ...>
          <!-- connect to TANGO device -->
          <desc>model=I/VAC/PUMP-01</desc>
        </circle>
        ...
      </g>
    </g>
    ...
  </g>
</svg>
```

The MAX IV Laboratory

The MAX IV Laboratory opened for operation in 1987 (under the name MAX-lab) and is a national laboratory operated jointly by the Swedish Research Council and Lund University. The laboratory supports three distinct research areas: Accelerator Physics, Research based on the use of Synchrotron Radiation, and Nuclear Physics using high energy electrons. At present three synchrotron storage rings are in operation MAX I-III and each year close to 1000 researchers visit the laboratory to perform experiments. The MAX IV laboratory is also responsible for the build up of the MAX IV facility situated in the Brunshög area just outside of Lund and approx 2 km from the present facility.