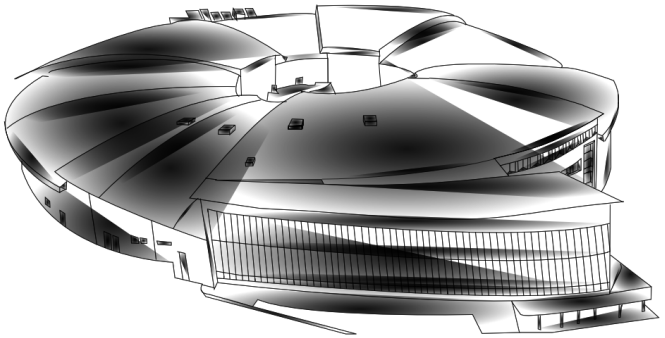
Taurus: Big & Small

from Particle Accelerators to Desktop Labs



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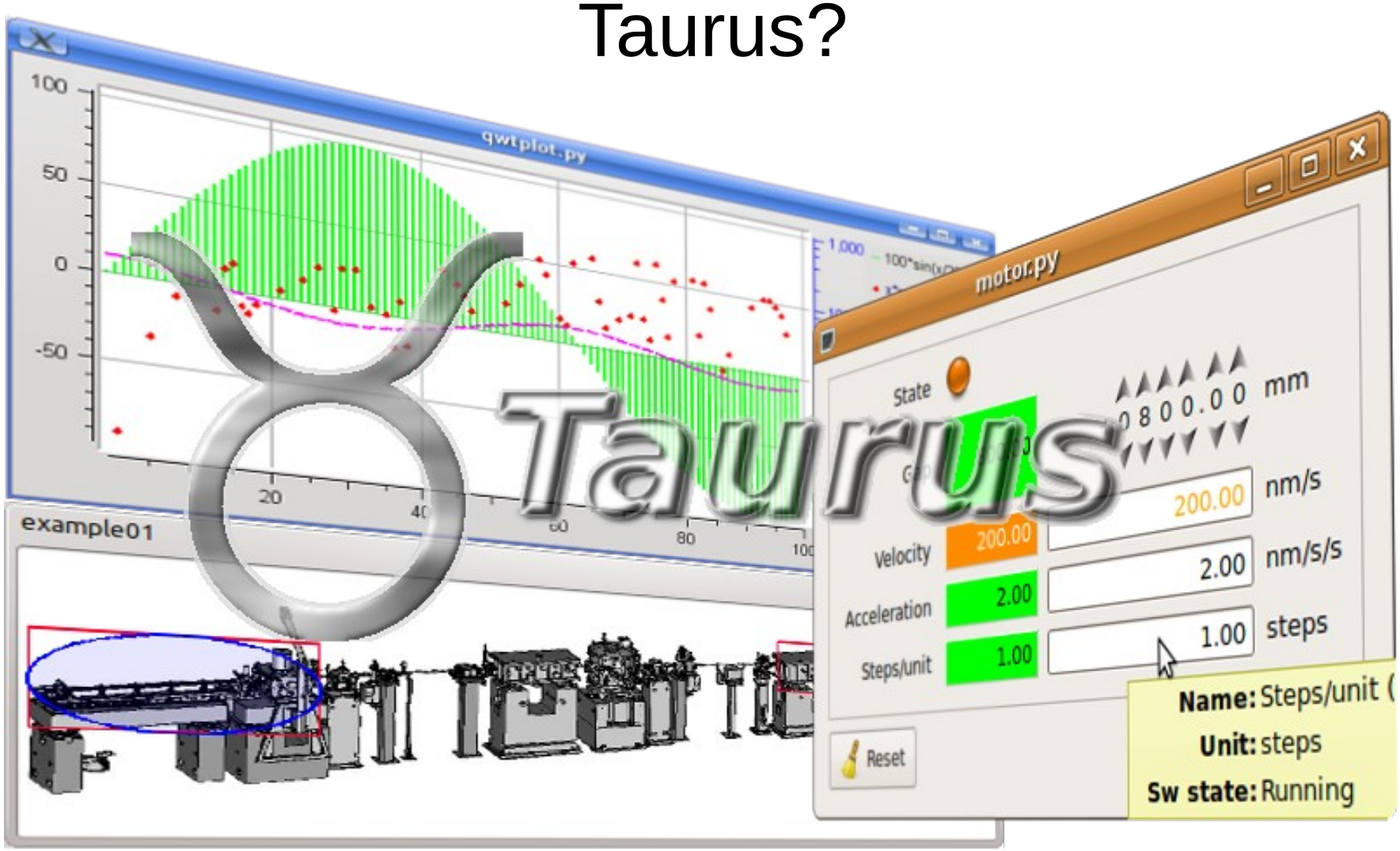
Taurus?

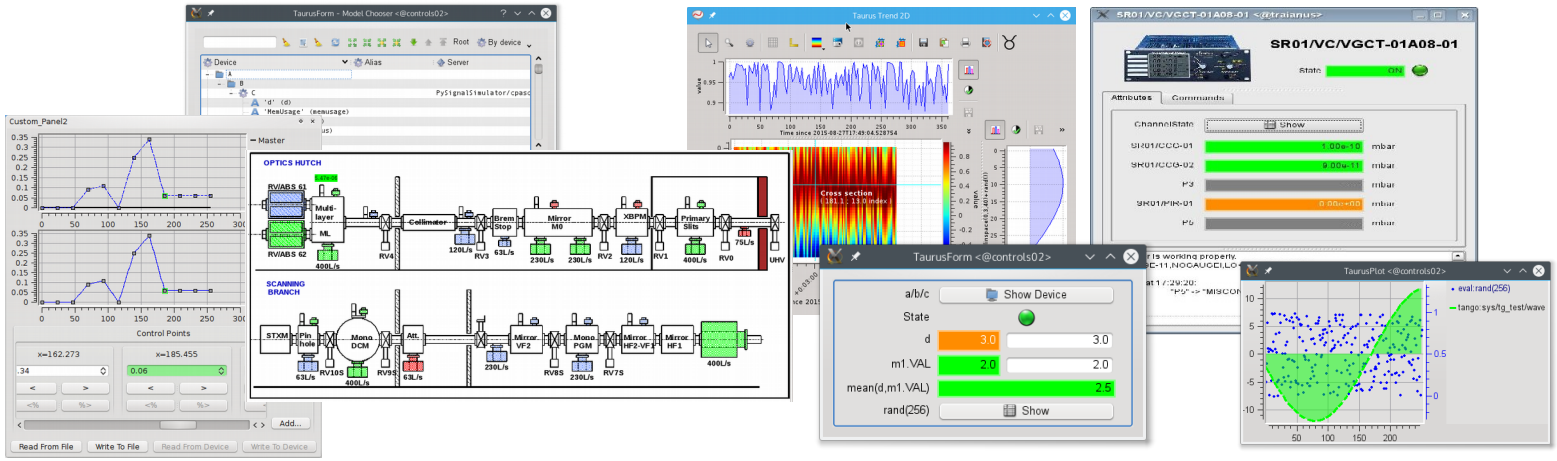


- **Taurus** is a framework for building control and data acquisition **CLIs** and **GUIs**
- It is based on **Python** and extends **PyQt**
- It supports plugins for various control systems (**Tango**, **EPICS**,...) or data sources (**HDF5**, **Python eval**,...)

MORE INFO https://taurus-scada.org

Structure of Taurus

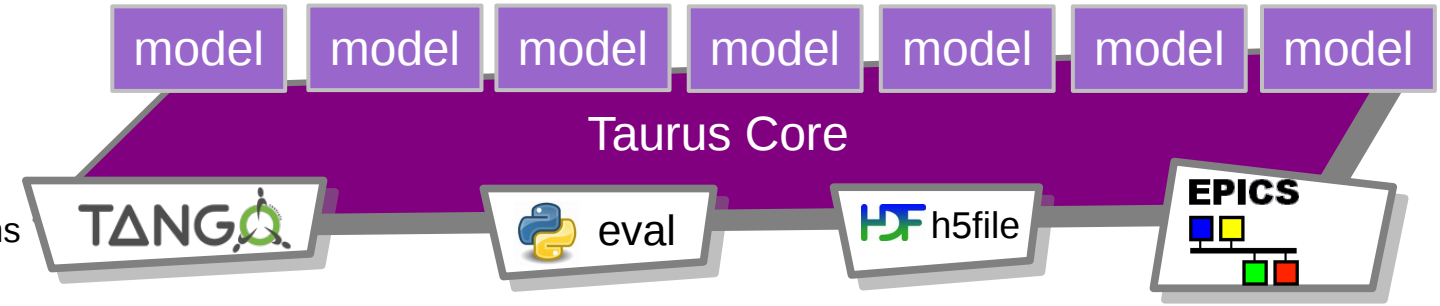
Taurus Qt Widgets



Taurus Core

Model Objects

Scheme plugins



Data Sources

Approaches to interface with unsupported sources

e.g., how to read data from a HDF5 file as an attribute?

Distributed Control System

Find (or write a new) DS capable of exposing contents of an hdf5 file as a Tango attribute...

h5file

Custom scheme

Use the custom h5file scheme plugin

```
h5file:/tmp/foo.h5::entry/time
```

eval

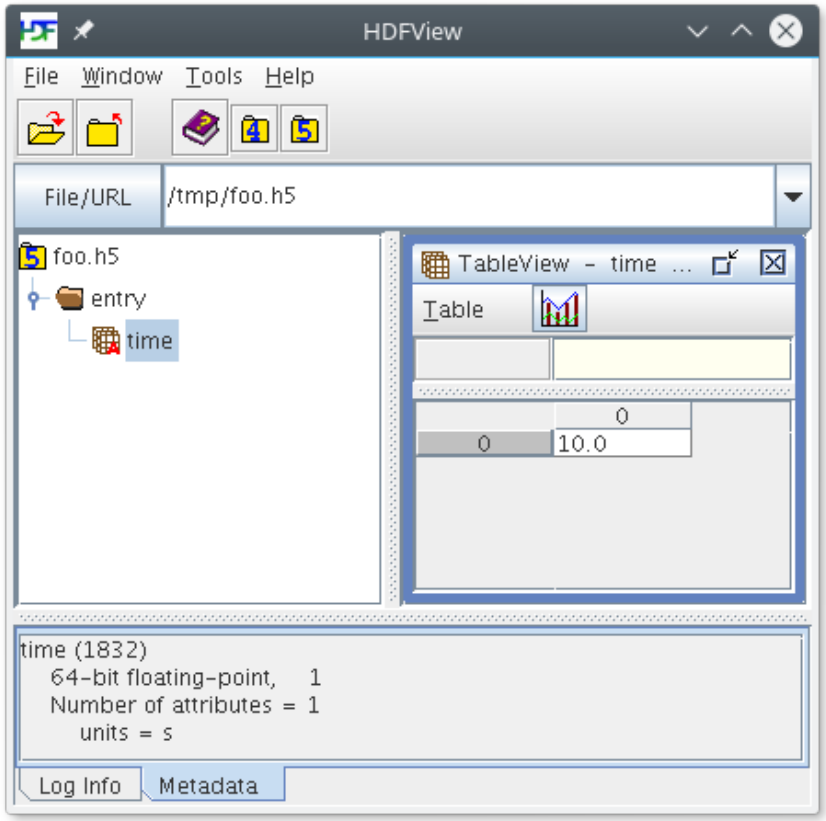
Evaluation scheme

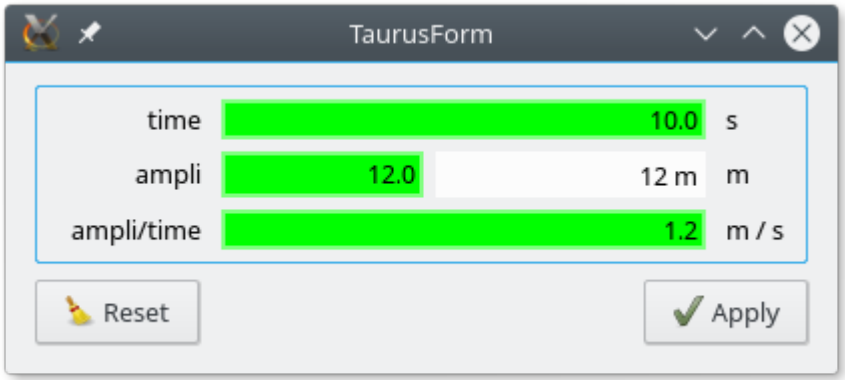
Use the eval scheme with the h5py module

```
eval:@f=h5py.File("/tmp/foo.h5")/f["entry/time"][:]
```

h5file scheme

```
$> pip install git+https://github.com/taurus-org/h5file-scheme.git
$> echo 'EXTRA_SCHEME_MODULES = ["h5file"]' >> taurus/tauruscustomsettings.py
$> taurusform h5file:/tmp/foo.h5::entry/time \
              tango:sys/tg_test/1/ampli \
              eval:{tango:sys/tg_test/1/ampli}/{h5file:/tmp/foo.h5::entry/time}
```





HDF5 TANGO eval

MORE INFO https://github.com/taurus-org/h5file-scheme

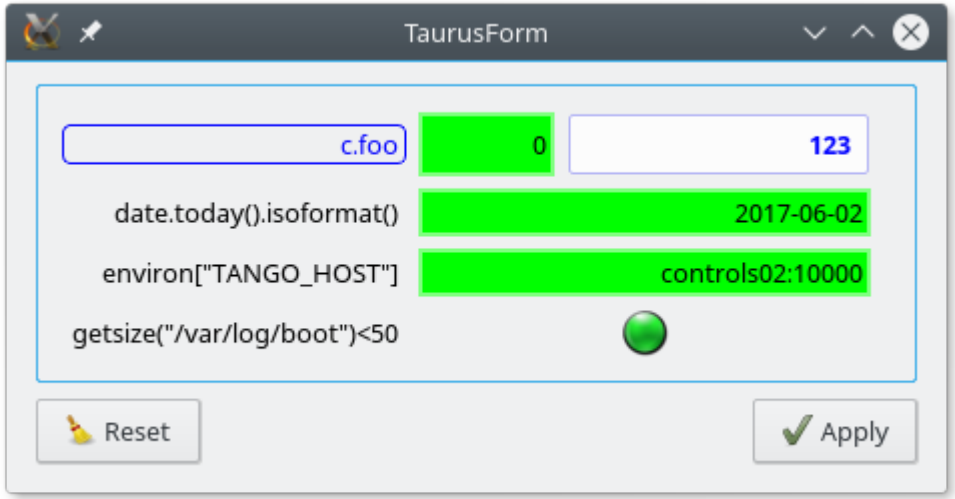
Eval scheme

- Allows mathematical evaluations
- Support writable eval attributes
- Use **any module or class** as a **custom evaluator**


```
$> taurusform 'eval:@c=mymod.MyClass()/c.foo'                    \
              'eval:@datetime.*/date.today().isoformat()'        \
              'eval:@os.*/environ["TANGO_HOST"]'                 \
              'eval:@os.path.*/getsize("/var/log/boot")<50'
```

mymod.py

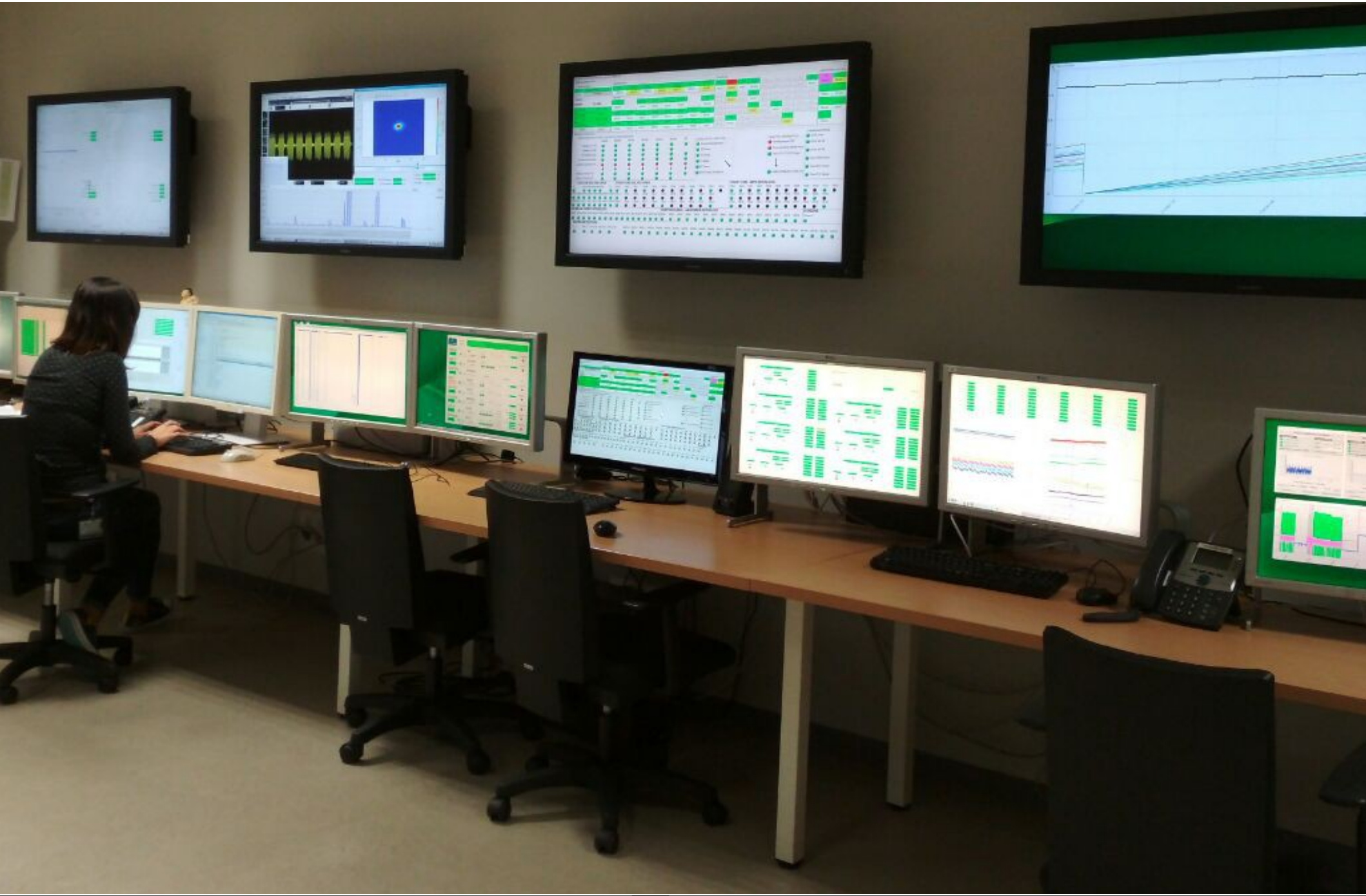
```
class MyClass(object):

    _foo = 0

    def get_foo(self):
        return self._foo

    def set_foo(self, value):
        self._foo = value

    foo = property(get_foo, set_foo)
```



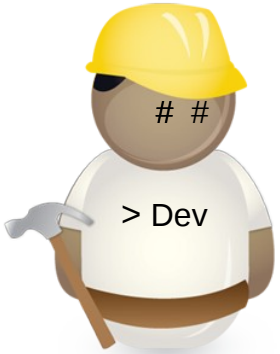
MORE INFO

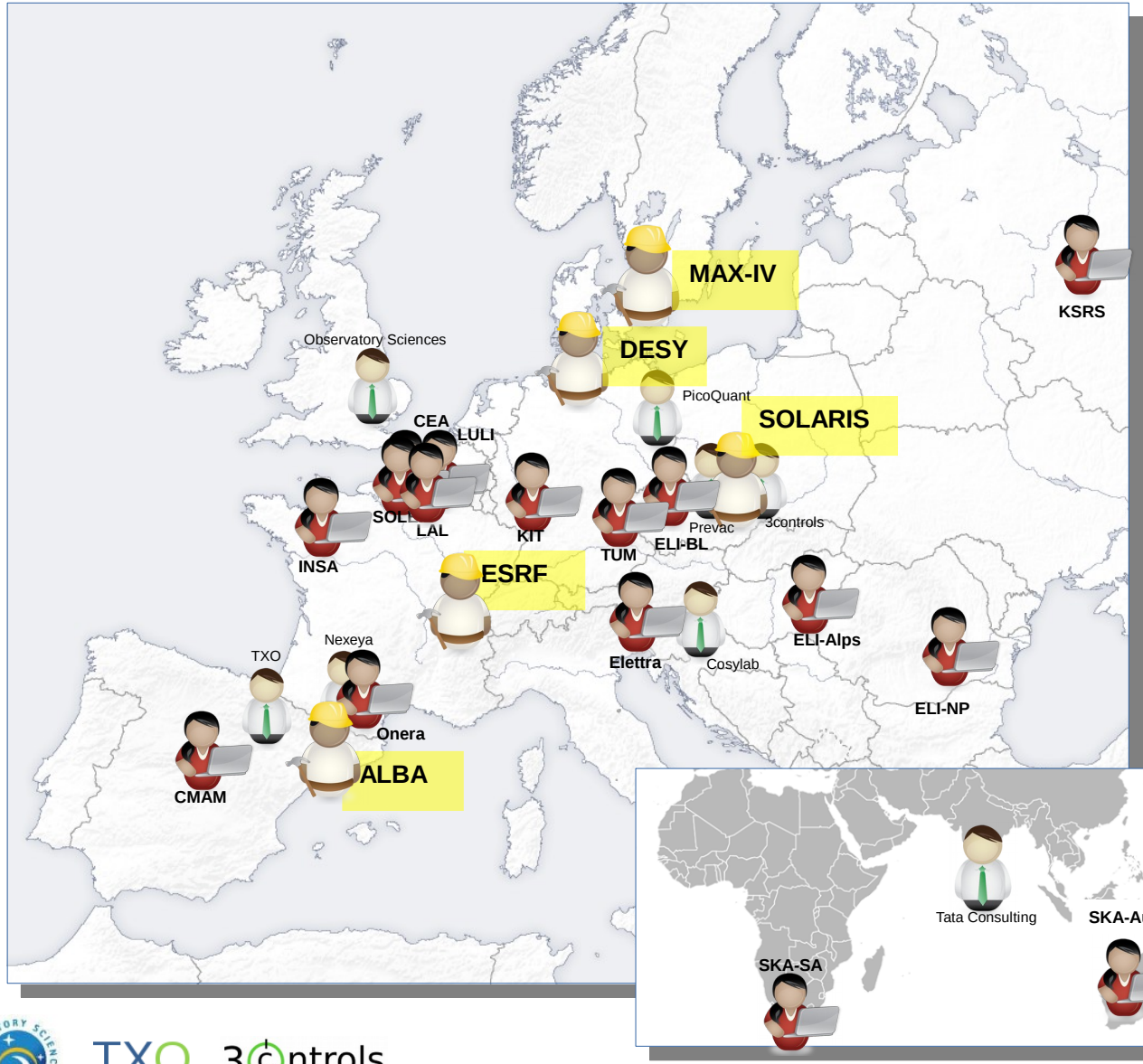
docs: http://www.taurus-scada.org/devel/api/taurus/core/evaluation.html
mymod example: taurus.core.evaluation.test.res.mymod

Taurus in large facilities



Taurus Community





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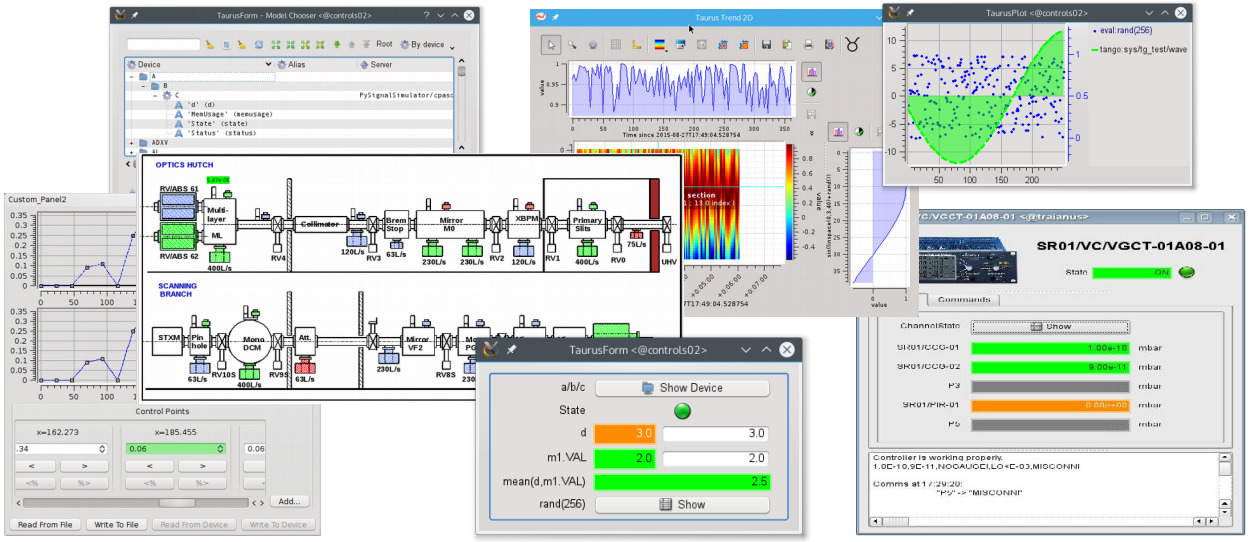
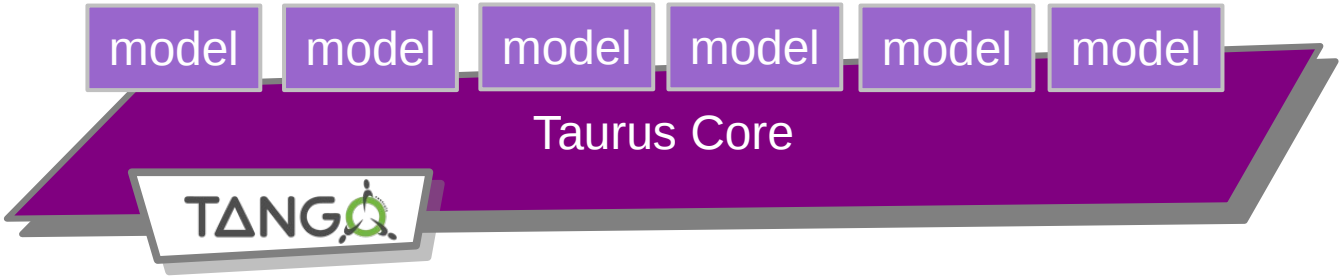
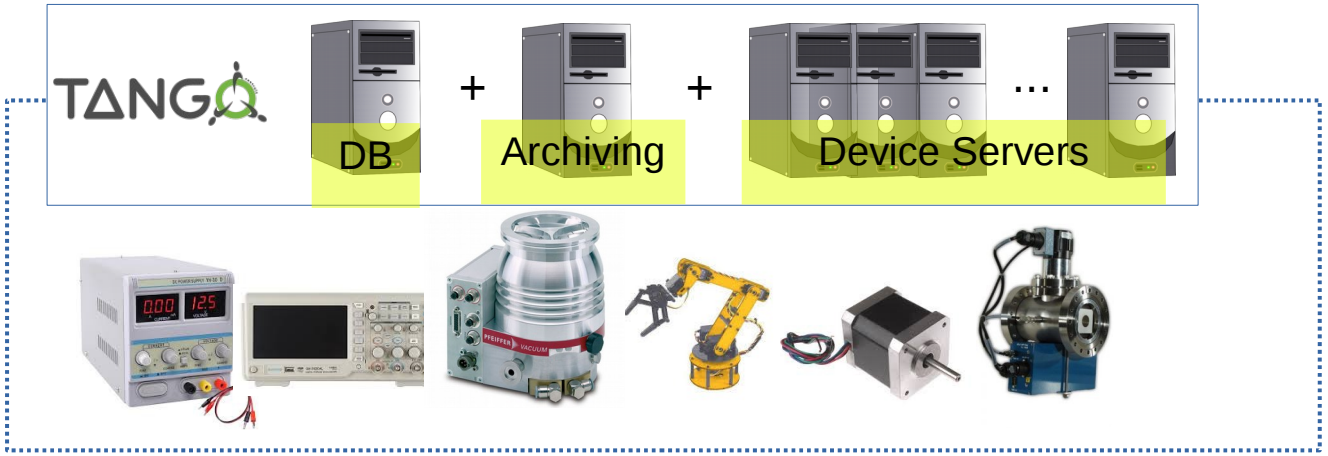
Taurus in large Facilities: example of ALBA

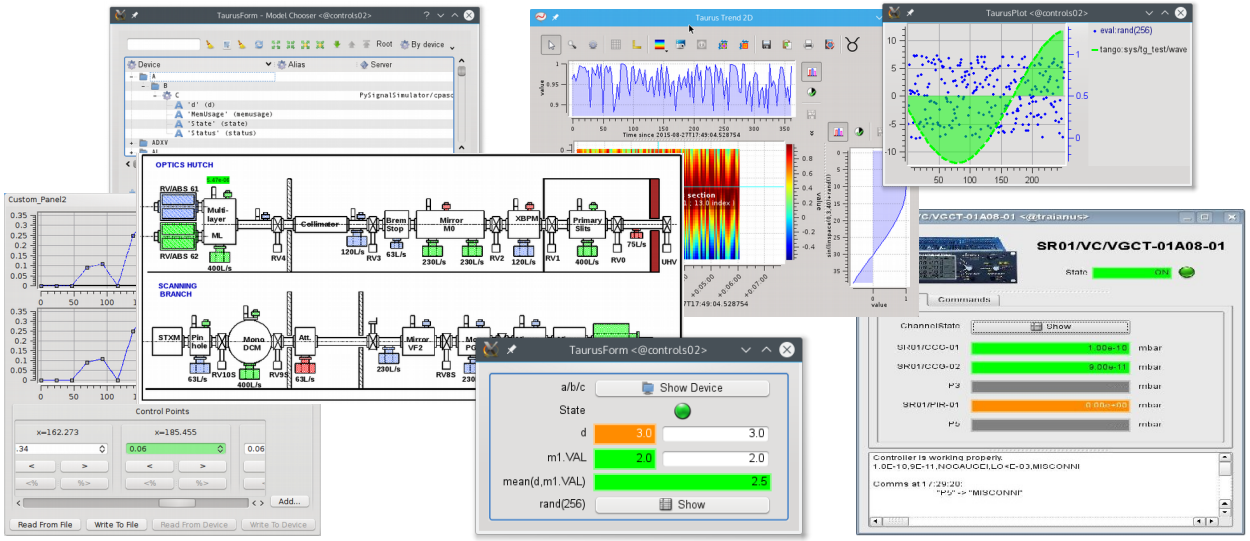


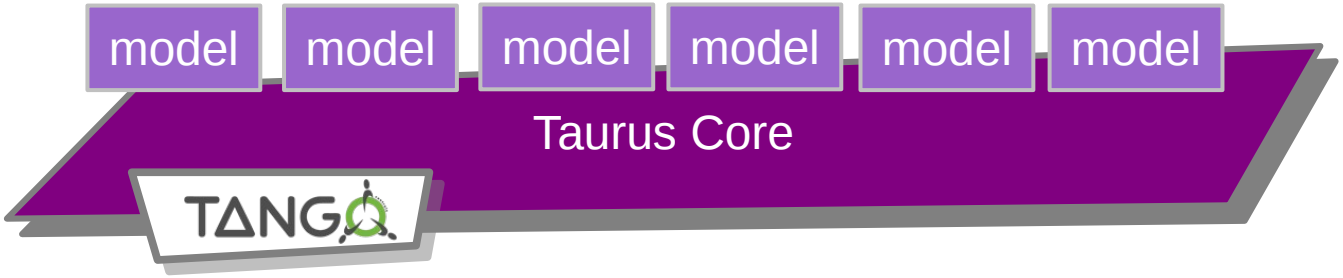


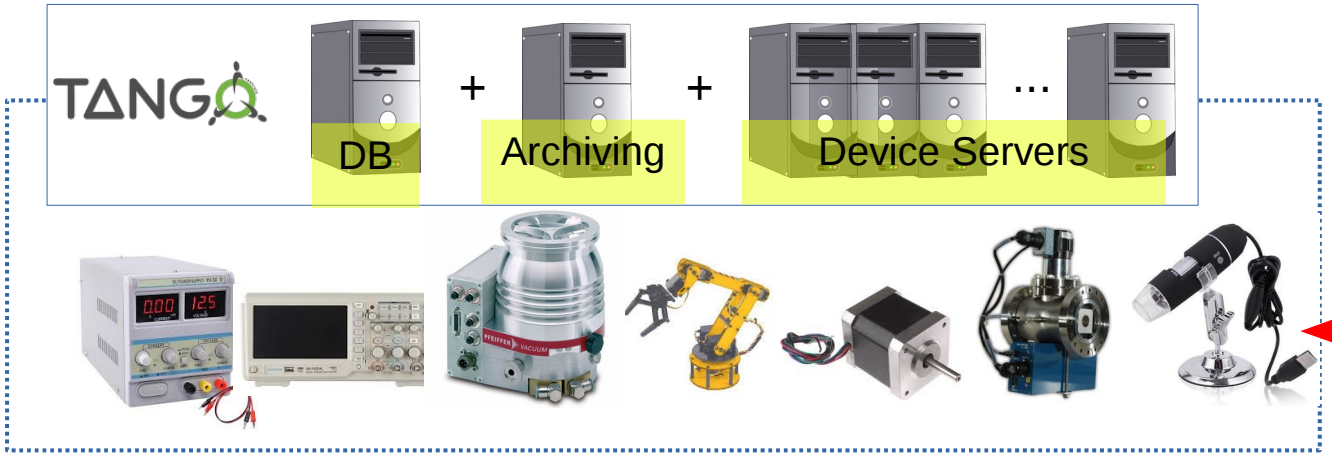


- Most of the control system relies on Tango
- ~100 Taurus GUIs
- ~300 machines
- ~10 Tango DBs
- ~100K Tango attributes
- New hardware **?**

Taurus in large Facilities: example of ALBA

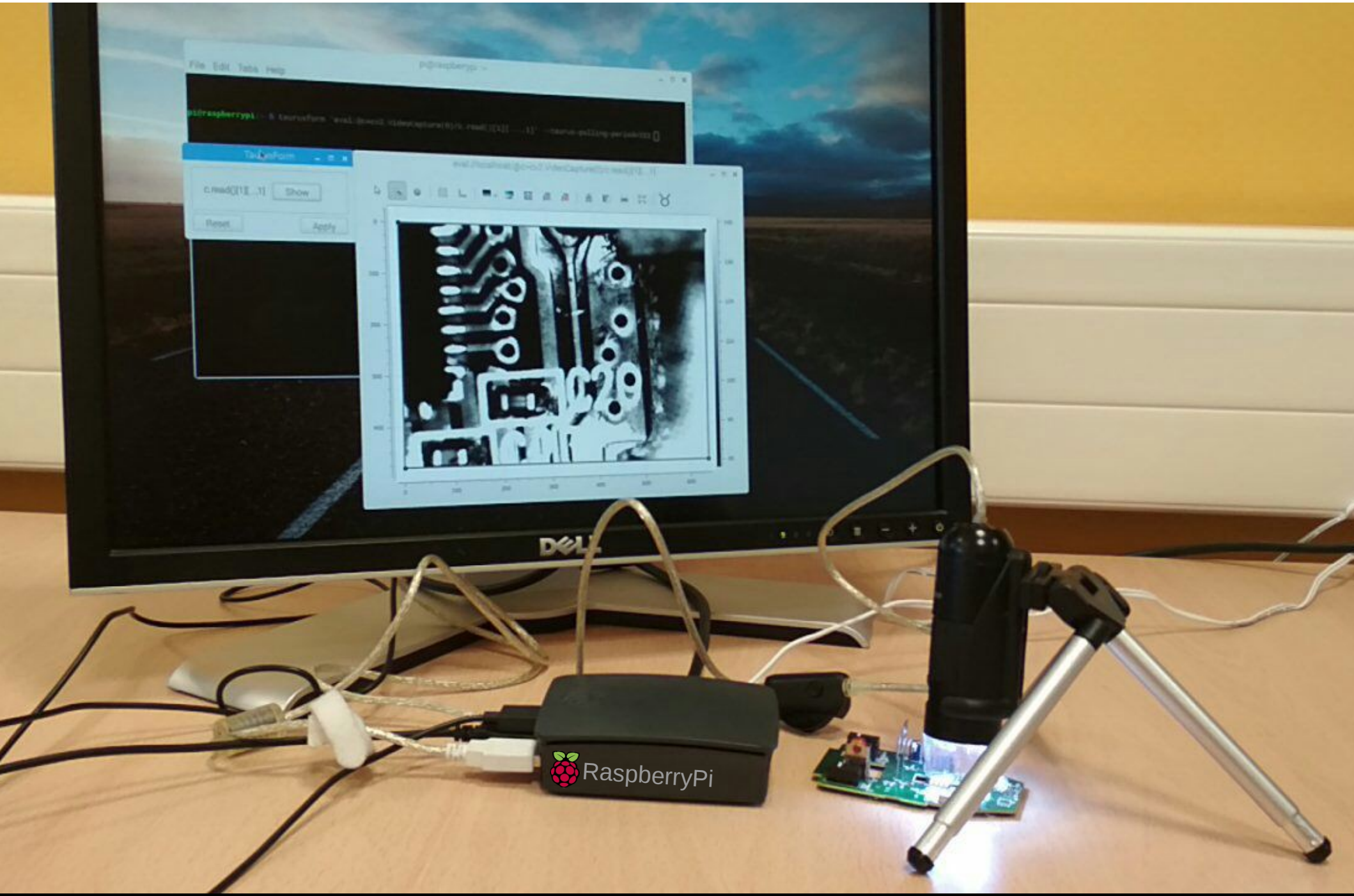




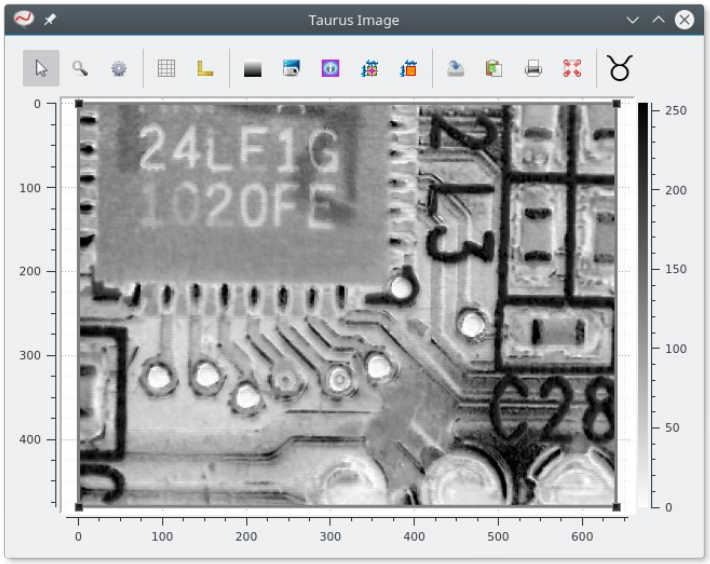


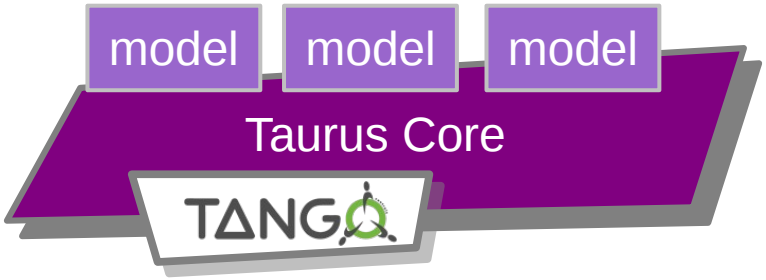
- Most of the control system relies on Tango
- ~100 Taurus GUIs
- ~300 machines
- ~10 Tango DBs
- ~100K Tango attributes
- New hardware → write a Tango Device Server

Taurus in “Desktop Labs”:



Taurus in “Desktop Labs”





Approach 1

Use same tools as for large facilities (scale-down): use a Distributed Control System on a single machine

- Install Taurus + Tango on a single machine:

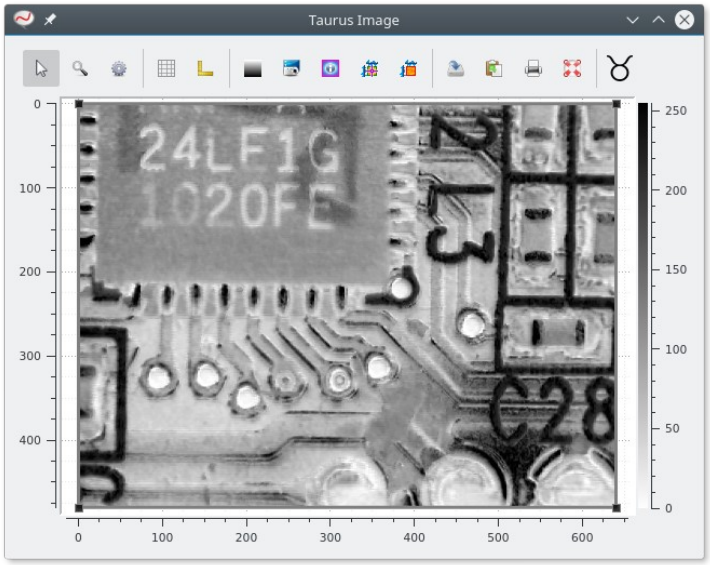
```
$> apt-get install default-mysql-server
$> apt-get install tango-db
$> apt-get install python-taurus
```

- Install, configure and run a Device Server supporting your hardware (or write a new one)

Recommended **if**:

- you are already familiar with Tango/EPICS
- the hardware is already supported by Tango/EPICS
- you do not mind the communication overhead

Taurus in “Desktop Labs”

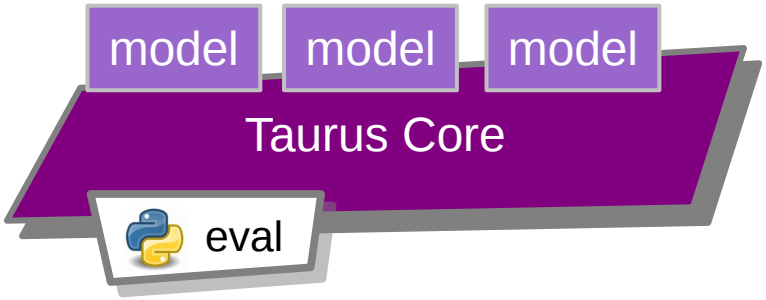


Approach 2

Use the eval scheme and connect directly

```
$> apt-get install python-taurus

$> taurusimage 'eval:@c=cv2.VideoCapture(0)/c.read()[1][...,1]'
```



Recommended **for**:

- single-machine systems
- quick prototyping
- quick support of new hardware

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