Sardana

Software for building SCADAS in scientific environments

Tiago Coutinho - ALBA's controls team

Do you want to know what it is?

Morpheus: Do you believe in fate, Neo? Why not?

Neo: Because I'm not in control of my laboratory

Morpheus: […] do you know what I am talking about?

Neo: *The Sardana*

Morpheus: Do you want to know what it is?

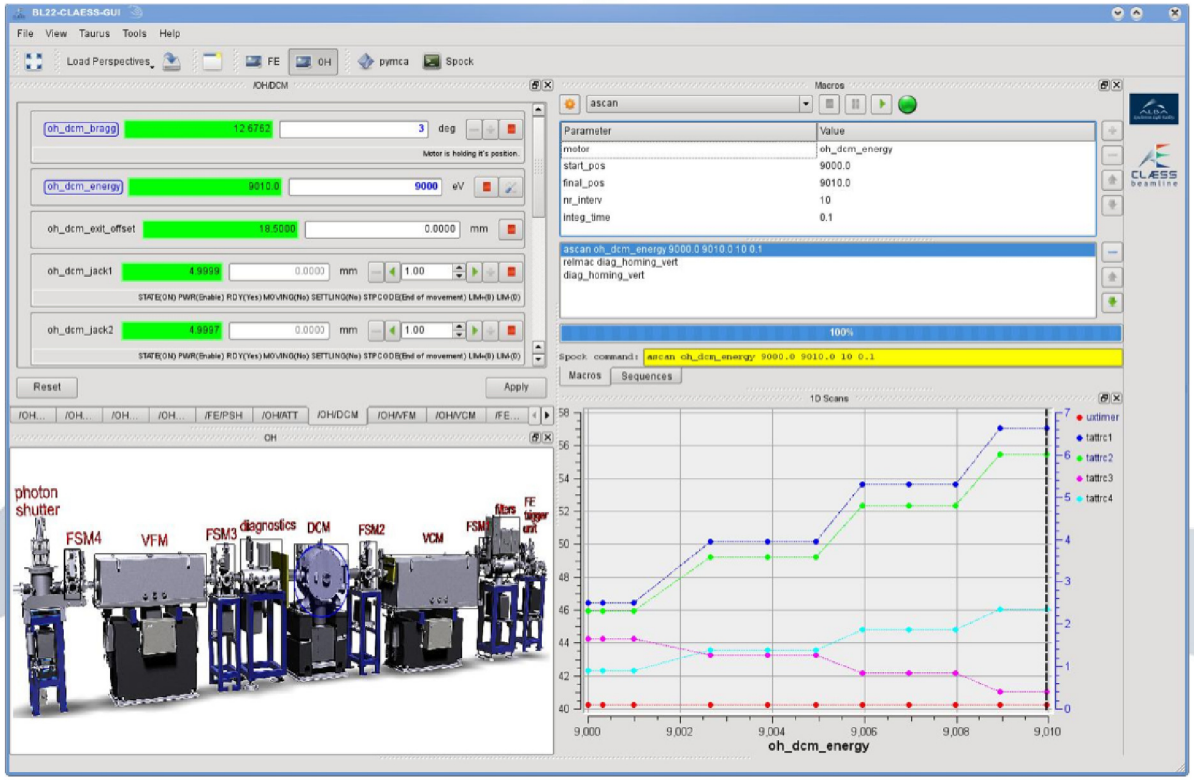
Neo: Yes!

Morpheus: *Sardana* is everywhere. It is all around us (in the lab). You can see it when you move a motor, when you monitor a temperature, when you do an energy scan.

A software package for instrument control and data acquisition

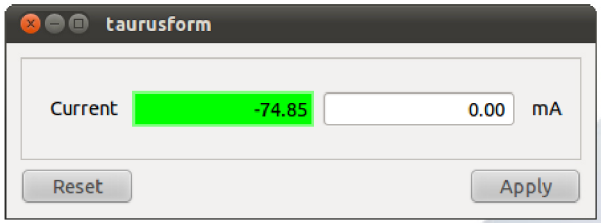
Generic Lab GUI

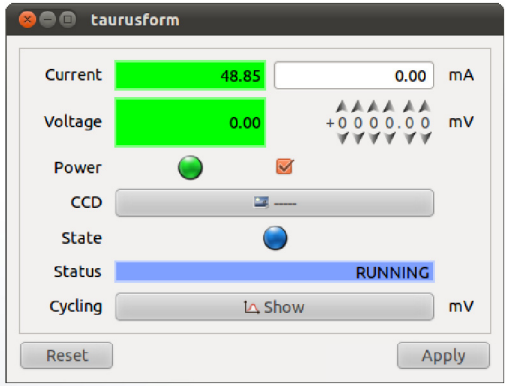
- Fully customizable
- Auto discovery
- Extensive widget catalog
- Drag-n-drop between applications

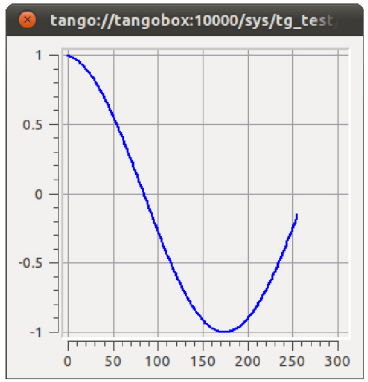


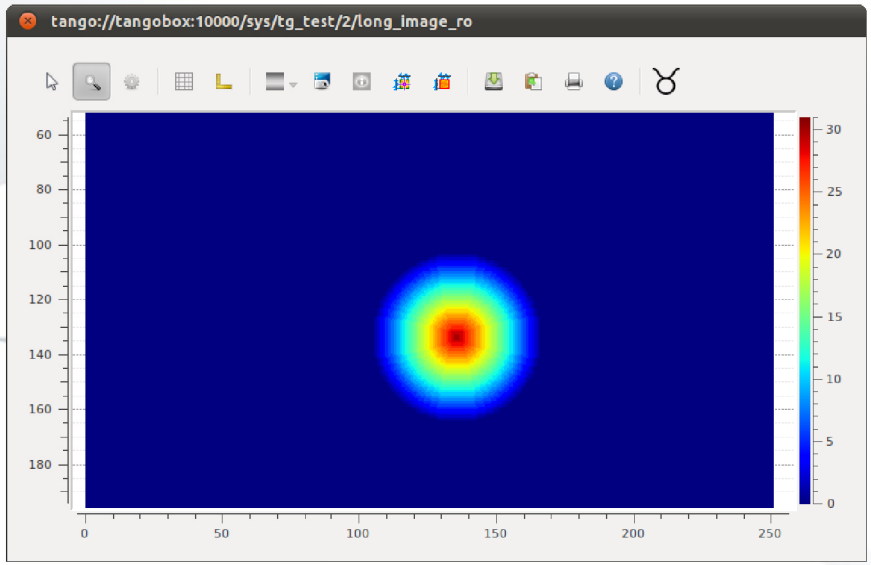
Customizable GUIs

1. At runtime



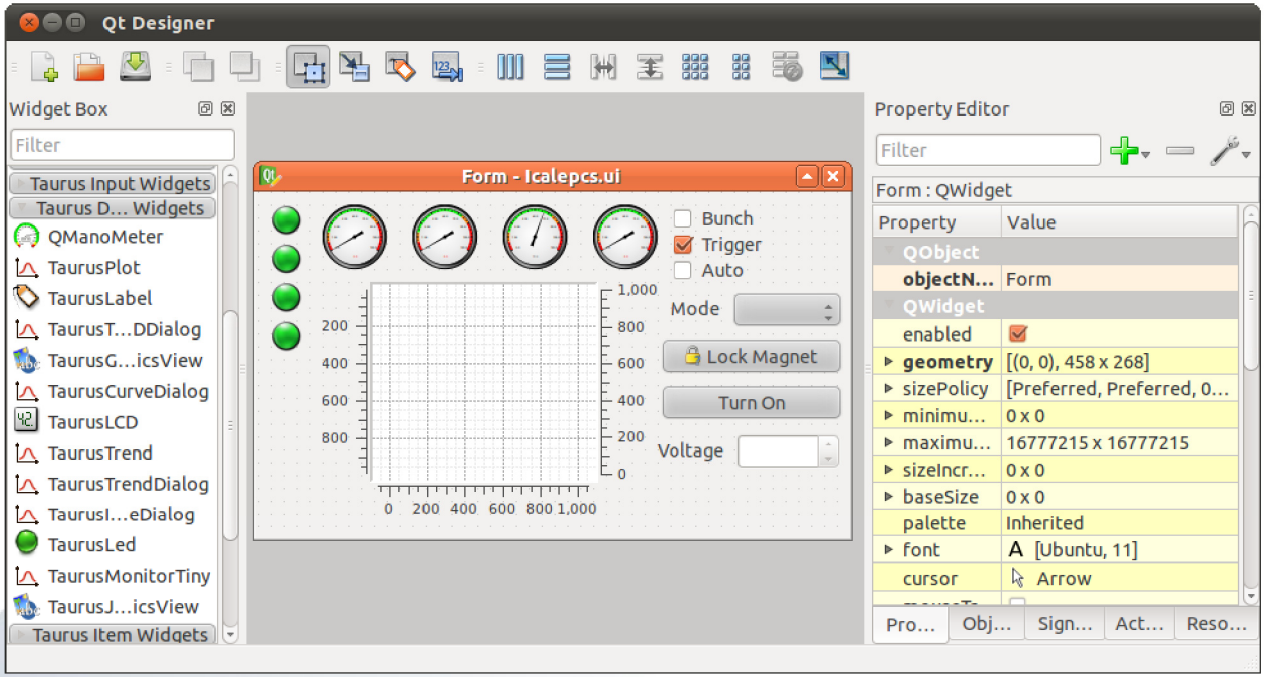






Customizable GUIs

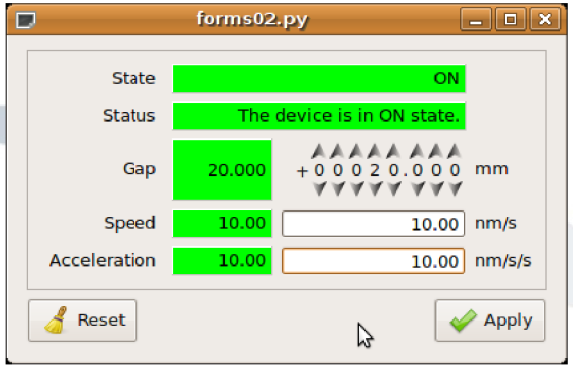
2. Designer



3. Write your own code

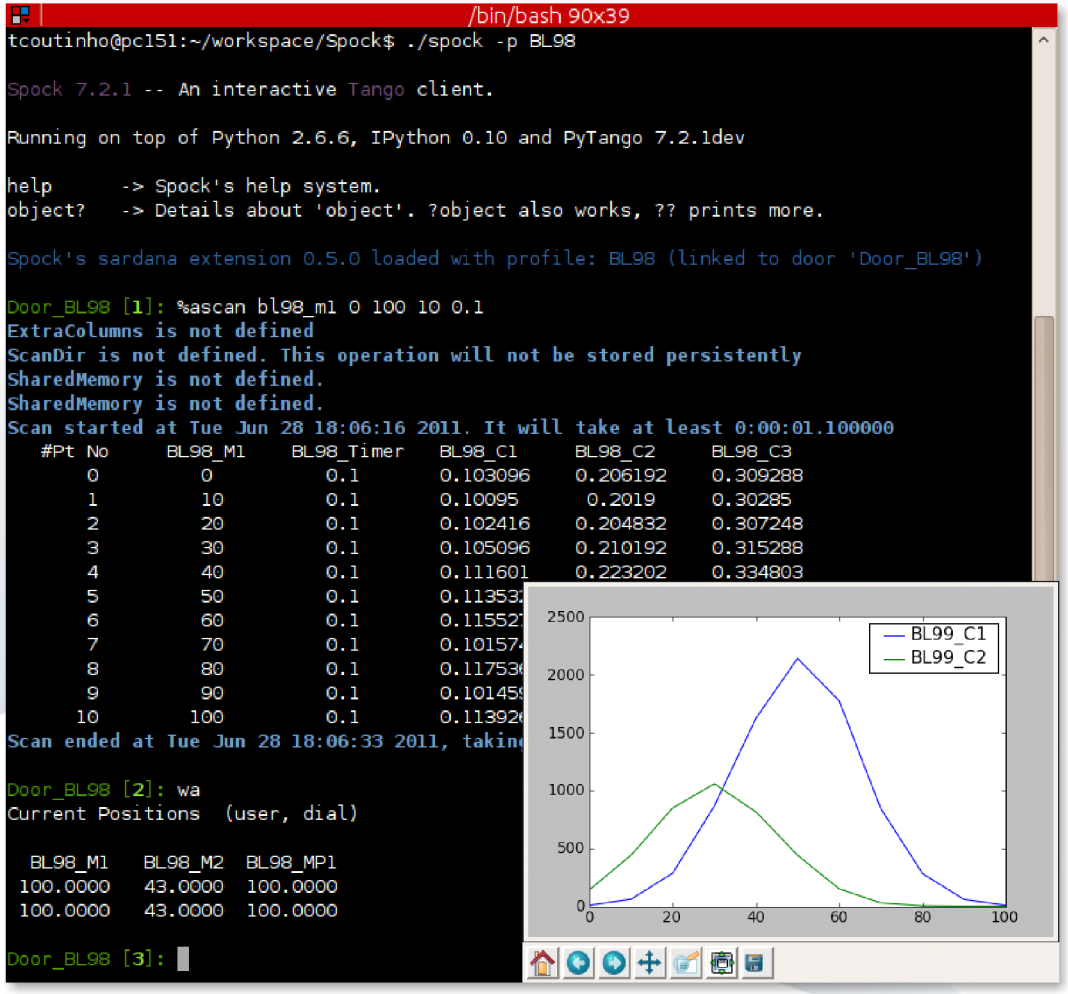
```
from taurus.qt.qtgui.panel import TaurusForm

panel = TaurusForm()
props = [ 'state', 'status', 'position', 'velocity', 'acceleration' ]
model = [ 'sys/taurustest/1/%s' % p for p in props ]
panel.setModel(model)
```



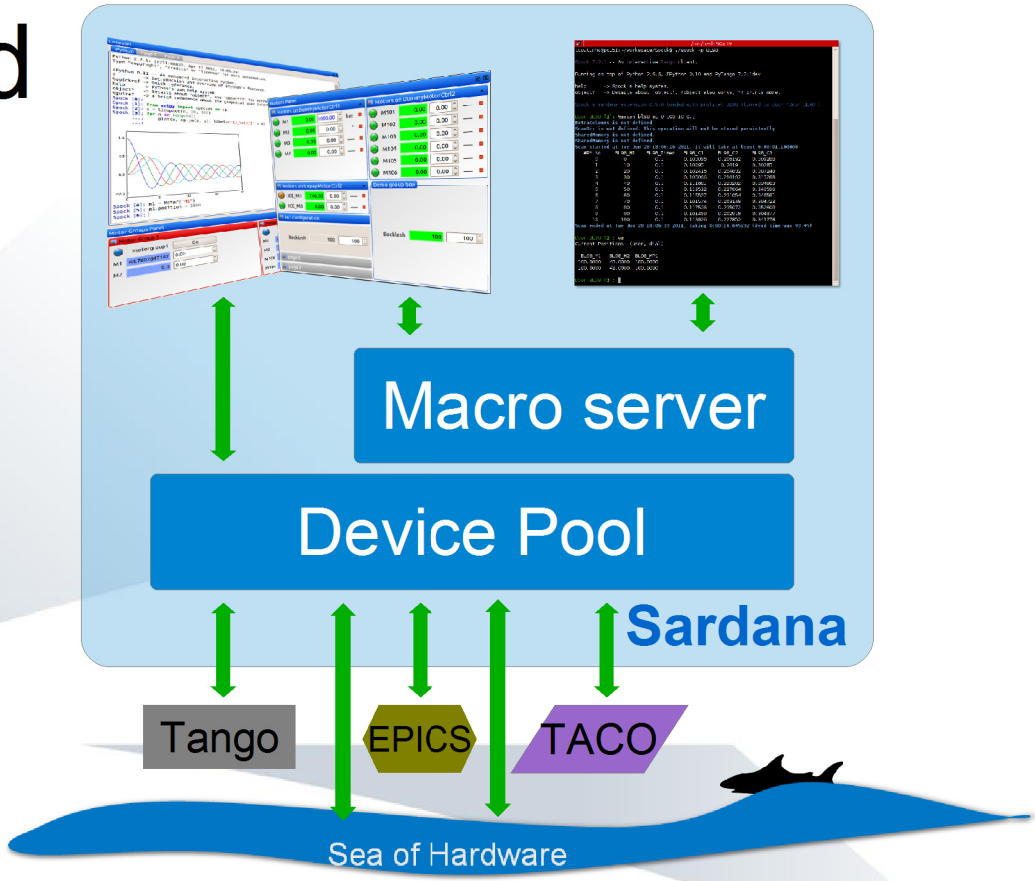
SPEC like CLI

- IPython based
- Context sensitive command completion
- Command history
- Help system
- Error handling



Other

- Free, open source (LGPL)
- Python oriented
  - Distributed
  - Extensible
  - Scalable
  - Tango based
  - Event based
  - Set of tools



Morpheus: You take the red pill, you stay in Wonderland, and I show you how deep the rabbit hole goes

Where do you intervene

Controller Plug-in

Device Pool

```
from sardana import State
from sardana.pool import MotorController

class NSC200Controller(MotorController):
  """This class is the Tango Sardana motor controller
  for the Newport NewStep handheld motion controller"""

  ctrl_properties = \
    { 'SerialCh' : { 'Type' : str,  'Desc' : '[...]' },
      'SwitchBox': { 'Type' : bool, 'Desc' : '[...]' }, }

  def AddDevice(self, axis):
    [...]

  def DeleteDevice(self, axis):
    [...]

  def StateOne(self, axis):
    if nsc200.is_moving(axis):
      return State.Moving, 'Motor in motion'
    return State.On, 'Motor is stopped'

  def ReadOne(self, axis):
    return nsc200.motor_position(axis)

  def StartOne(self, axis, pos):
    self.pos[axis] = pos

  def StartAll(self):
    nsc200.send_move_command(self.pos)

  def AbortOne(self, axis):
    nsc200.send_abort_command(axis)
```

Macro Plug-in

Macroserver

```
from sardana.macroserver import Macro, Type

class move(Macro):
  """moves a motor to the specified absolute
  position."""

  param_def = \
    ['motor', Type.Motor, None, 'motor to move',
     'pos'  , Type.Float, None, 'absolute position']

  def run(self, motor, pos):
    self.debug('Moving %s to %s', motor, pos)
    motor.move(pos)
    self.info('Ended moving %s to %s', motor, pos)
```

GUI / CLI

Taurus

```
from taurus.qt.qtgui.application import TaurusApplication
from taurus.qt.qtgui.panel import TaurusForm

app, panel = TaurusApplication(), TaurusForm()
attrs = 'state', 'status', 'position', 'velocity'
model = [ 'BL00/ENERGY/1/%s' % a for a in attrs ]
panel.model = model
panel.show()
app.exec_()
```

Neo: […] I can dodge bullets?
Morpheus: […] when you're ready, you won't have to.

Timeline

[…] in the early twenty-first century...

PyTango

Python
tauico & tauiwi

C++
Device pool

2004 2005 2006 2007

… End of 2011

Python
Tau

Python
Taurus

Python
Macroserver

Python
Device pool

2008 2009 2010 2011

Morpheus: We have only bits and pieces of information but […] at some point in the early twenty-first century all of mankind was united in celebration. We marveled at our own magnificence as we gave birth to... *Sardana!*

Why?

- Fully customizable/programmable GUI framework
- Familiar looking CLI
- Python oriented
- Free, open source

- Distributed C-S arch
- Scalable
- Multi-threaded

- Tango, Qt, Python
- Fairly documented

Morpheus: Unfortunately, no one can be told what *the Sardana* is. You have to see it for yourself:

www.tango-controls.org/static/sardana/latest/doc/html/index.html

www.tango-controls.org/static/taurus/latest/doc/html/index.html
www.tango-controls.org/static/PyTango/latest/doc/html/index.html

Acknowledgment

- ALBA's computing division
- ELETTRA computing group
- ESRF Tango & BLISS groups
- FRM II computing group
- HASYLAB computing group
- MAX-lab computing group
- SOLEIL computing group

Questions