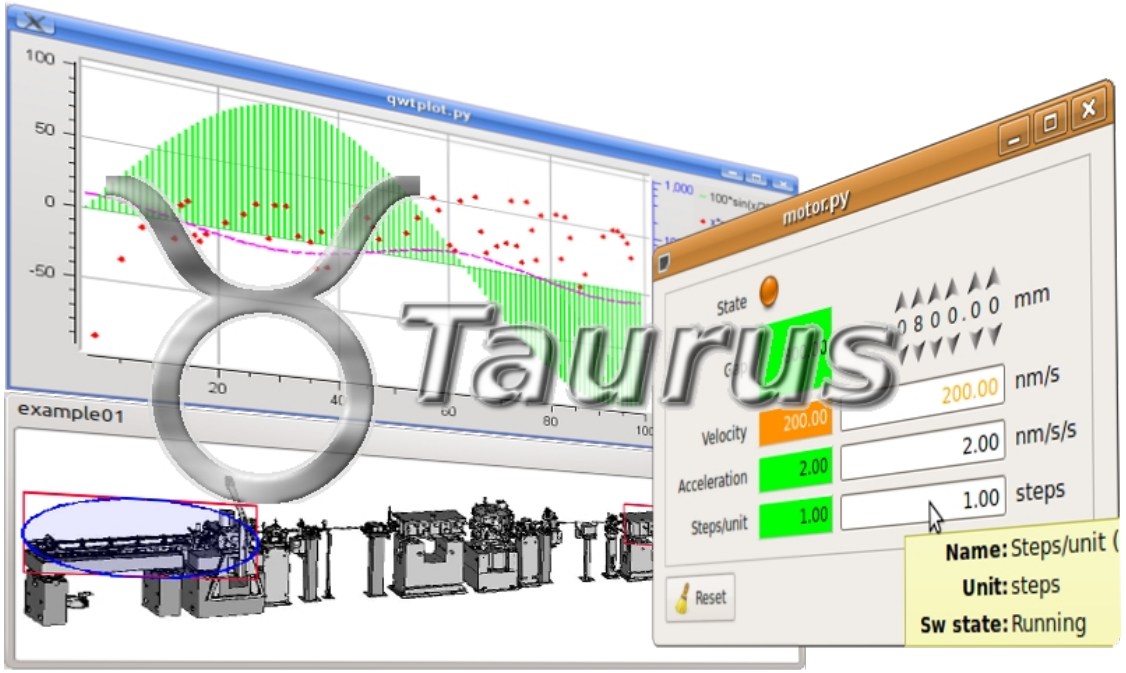
Taurus Status

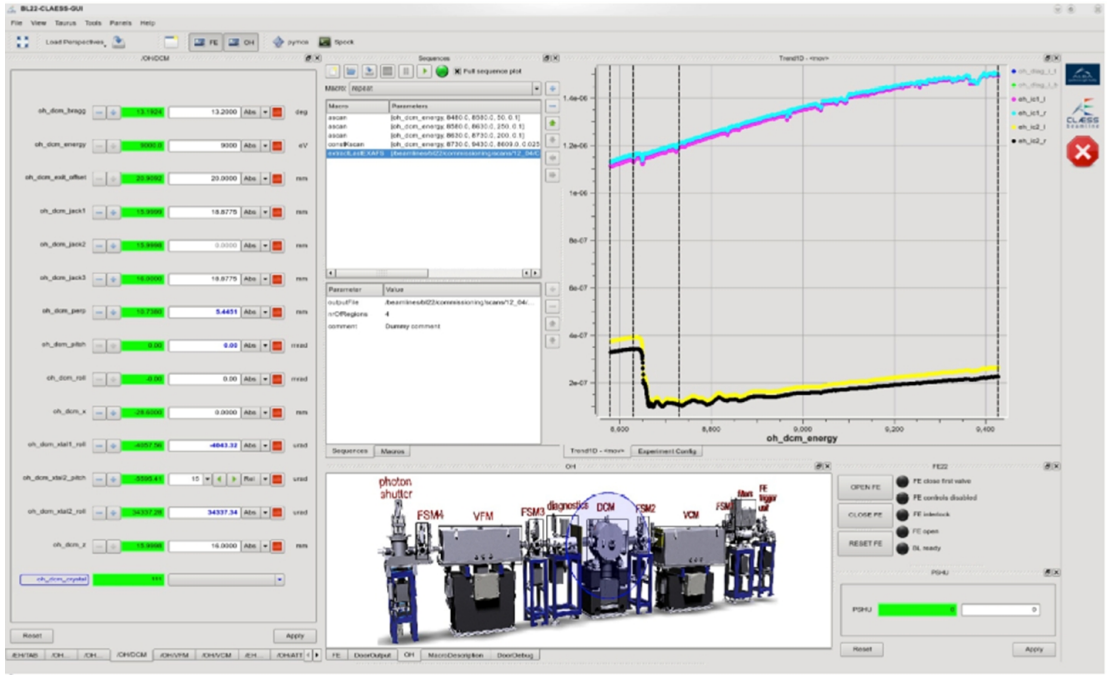
by

Carlos Pascual-Izarra
(on behalf of Alba's Controls group)

29th Tango Meeting,
May 2015



Taurus is...



*"**Taurus** is a **python** framework for control and data acquisition **CLIs** and **GUIs** in scientific/industrial environments. It supports multiple control systems or data sources: **Tango**, **EPICS**, **Spec**... New control system libraries can be integrated through plugins."*

- Widely used
- Production-ready
- Well supported
- Actively developed
- Free/Open Source
- Community-driven
- Multi-platform
- Based on Python and Qt
- Easy to install

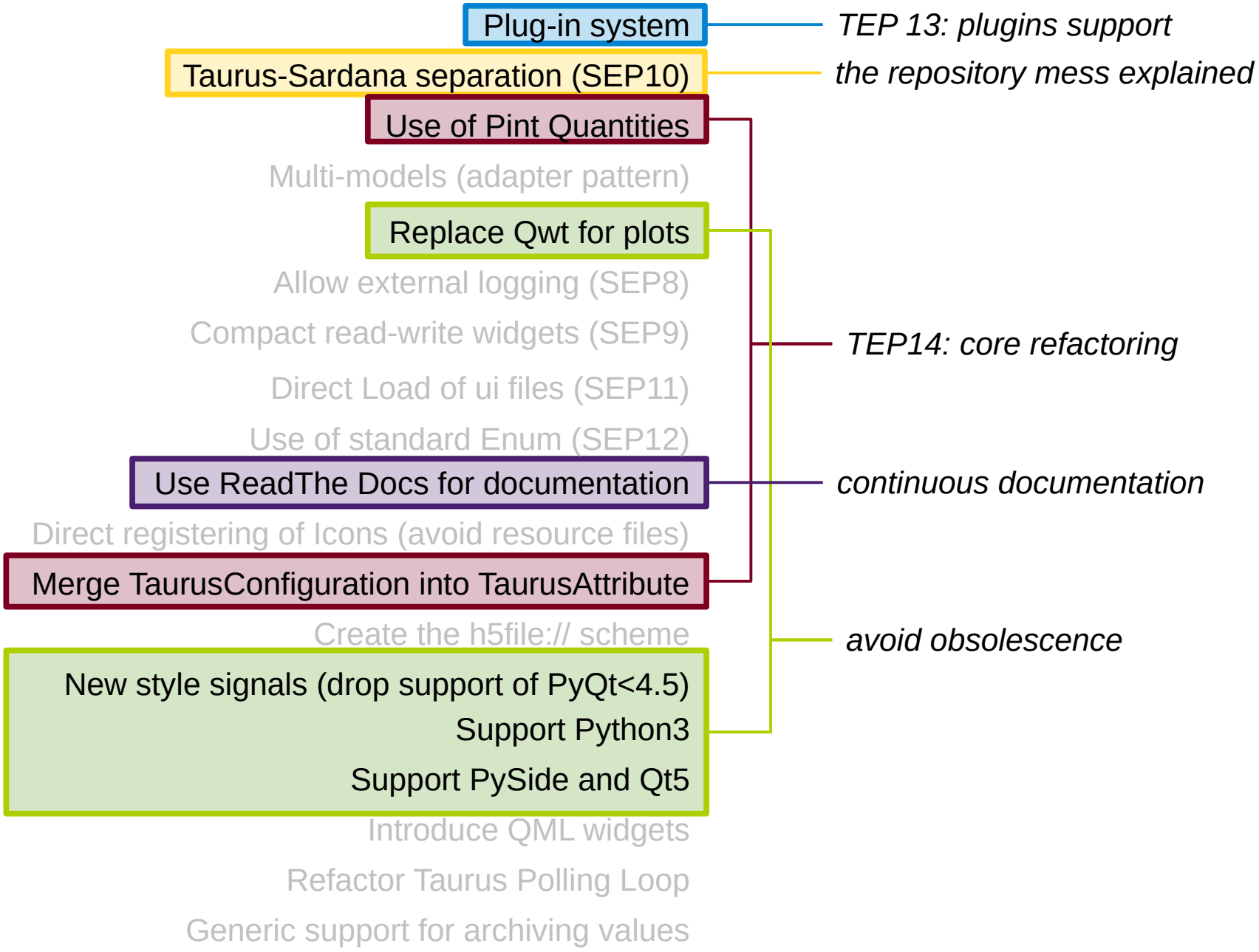
TO-DOs (one year ago)

- Plug-in system
- Taurus-Sardana separation (SEP10)
- Use of Pint Quantities
- Multi-models (adapter pattern)
- Replace Qwt for plots
- Allow external logging (SEP8)
- Compact read-write widgets (SEP9)
- Direct Load of ui files (SEP11)
- Use of standard Enum (SEP12)
- Use ReadThe Docs for documentation
- Direct registering of Icons (avoid resource files)
- Merge TaurusConfiguration into TaurusAttribute
- Create the h5file:// scheme
- New style signals (drop support of PyQt<4.5)
- Support Python3
- Support PySide and Qt5
- Introduce QML widgets
- Refactor Taurus Polling Loop
- Generic support for archiving values

TO-DOs (now)

Plug-in system	*Work in progress*
Taurus-Sardana separation (SEP10)	✔ ***Finished***
Use of Pint Quantities	*Prototype ready*
Multi-models (adapter pattern)	*No progress*
Replace Qwt for plots	*Resources committed*
Allow external logging (SEP8)	*No progress*
Compact read-write widgets (SEP9)	✔ ***Finished***
Direct Load of ui files (SEP11)	✔ ***Finished***
Use of standard Enum (SEP12)	*Little progress*
Use ReadThe Docs for documentation	✔ ***Finished***
Direct registering of Icons (avoid resource files)	*No progress*
Merge TaurusConfiguration into TaurusAttribute	*Work in progress*
Create the h5file:// scheme	*No progress*
New style signals (drop support of PyQt<4.5)	*Preliminary discussions*
Support Python3	*No progress*
Support PySide and Qt5	*No progress*
Introduce QML widgets	*No progress*
Refactor Taurus Polling Loop	✔ ***Finished***
Generic support for archiving values	*Preliminary discussions*

Topics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the repository mess explained
TEP14: core refactoring
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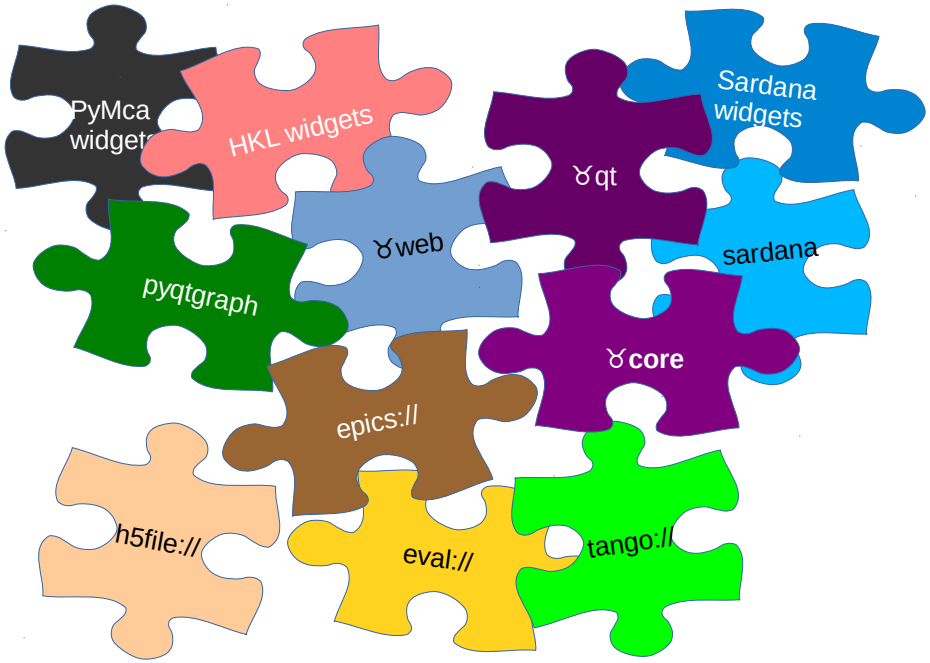
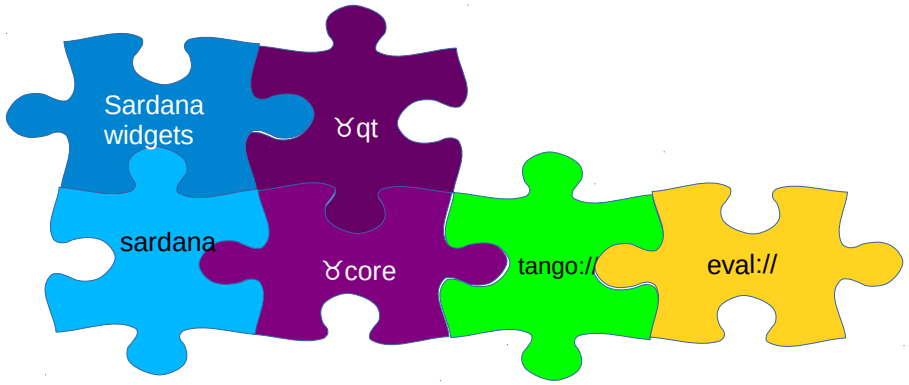
TEP13: Plugins support



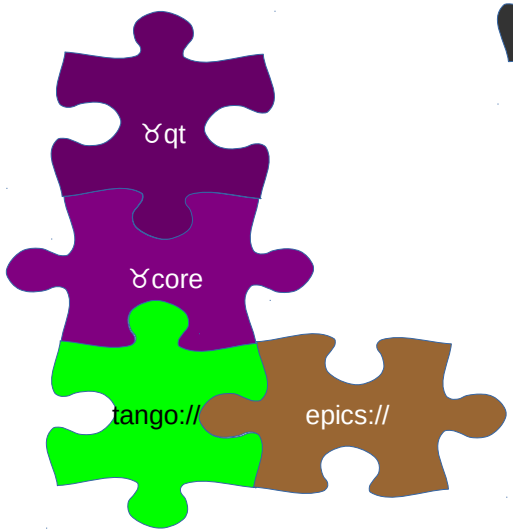
http://sf.net/p/tauruslib/wiki/TEP13

Plugins will make Taurus...

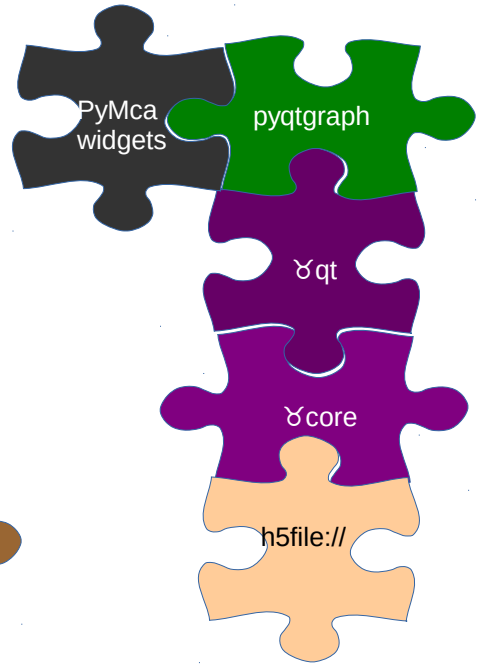
- Light: most dependencies optional
- Extendable for user specific need
- Taurus usable as a library for data analysis GUIs (not connected to control system at all)



***Example**: Taurus+Sardana as we use it now in ALBA*

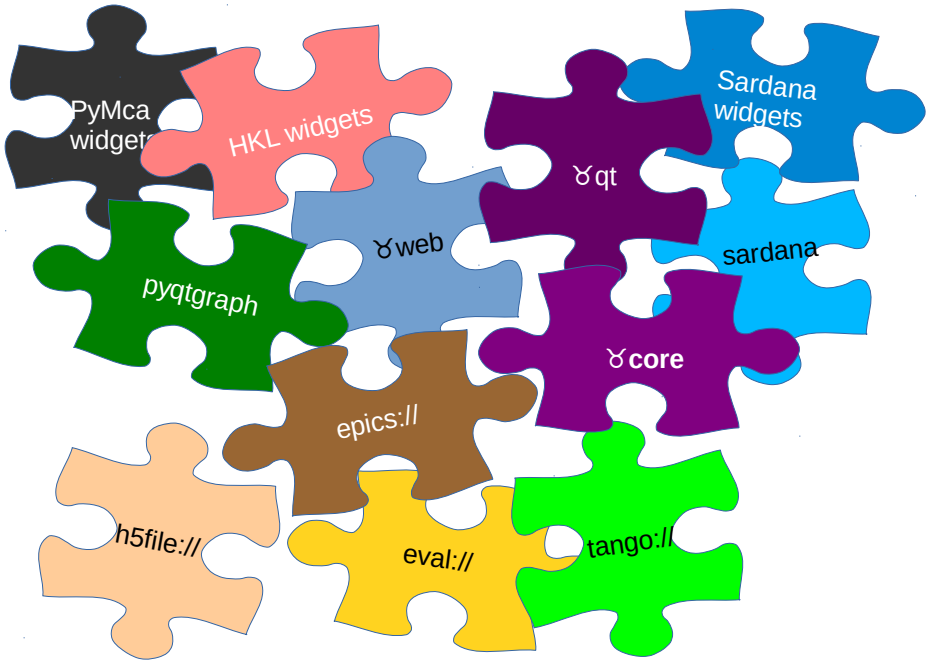


***Example**: Controlling a mixed Tango+EPICS environment*



***Example**:Taurus for Data Analysis (no control system)*

TEP13: Plugins support



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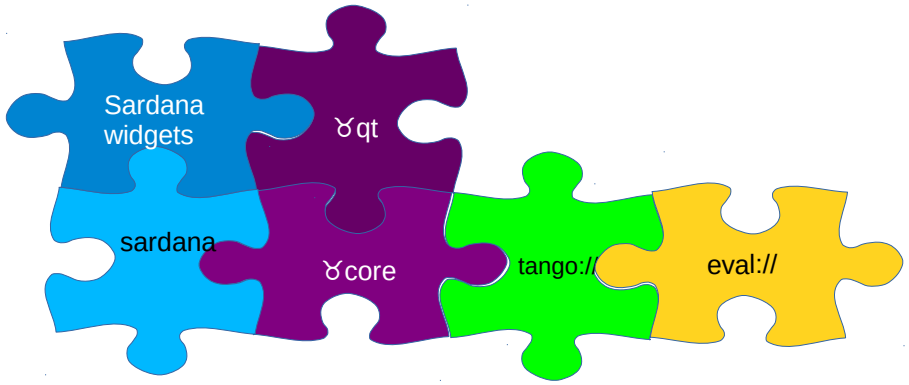
stevedore is the main candidate:

- based on setuptools entry points
- manages dependencies (requires/provides)
- systematic approach
- well documented

https://pypi.python.org/pypi/stevedore



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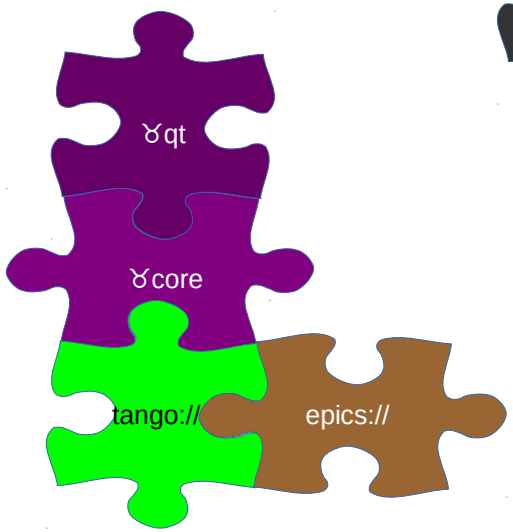

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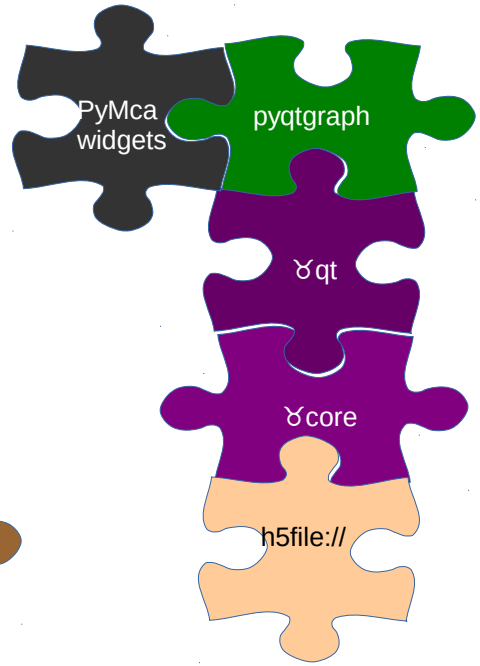

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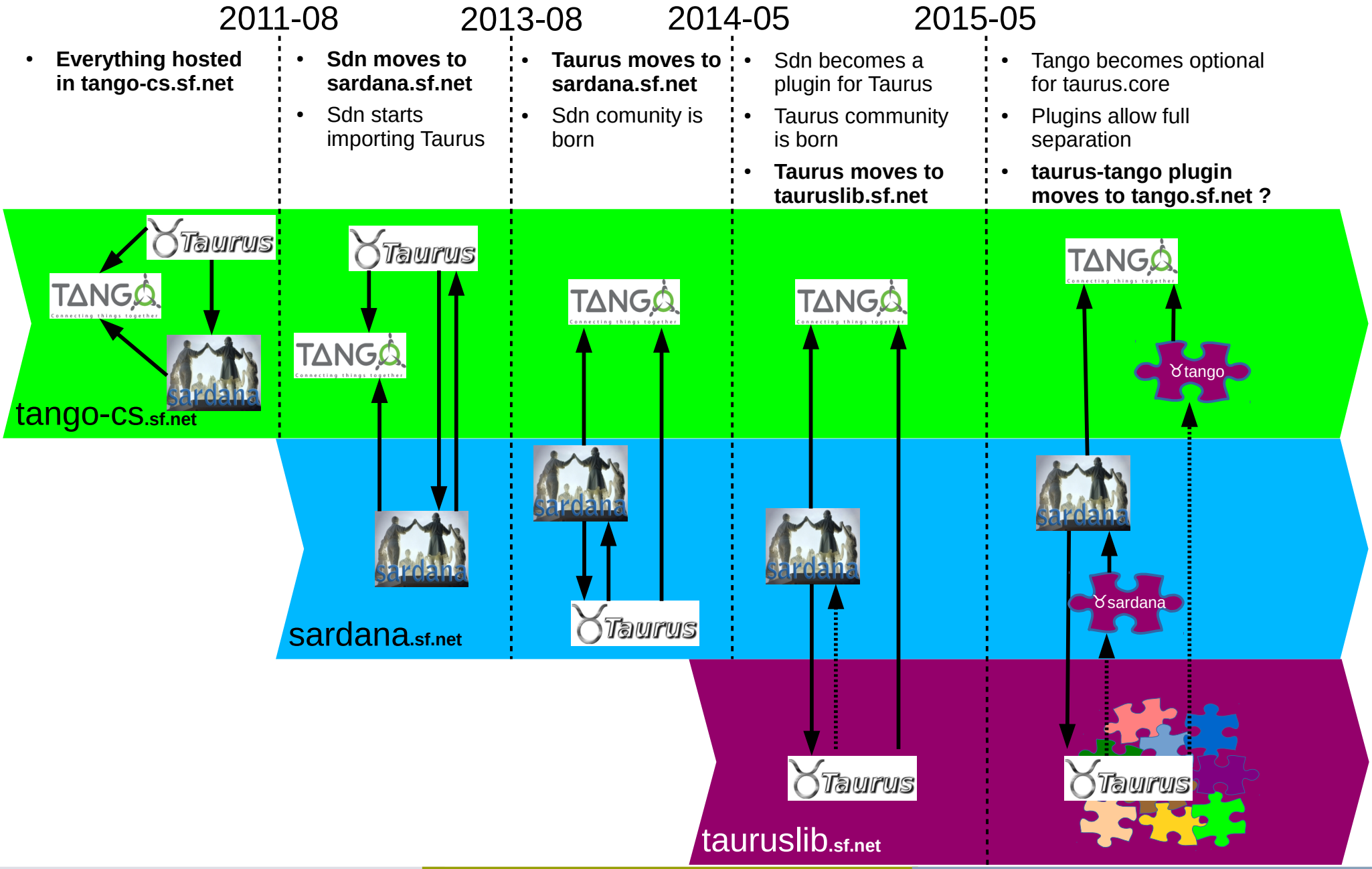
The repository mess explained



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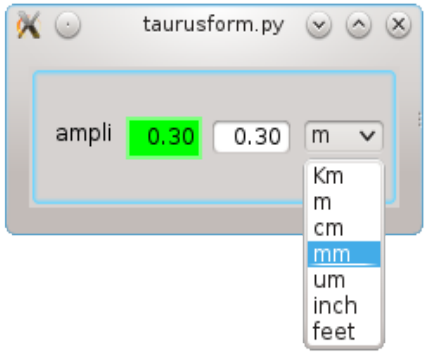
Use Quantities for **int** and **float** types:

	0D	1D	ND
bytes	bytes		
str	str	seq<str>	seq<seq<...<str>>>
bool	bool numpy.bool	ndarray (dtype=bool)	ndarray (dtype=bool)
int / float	pint.Quantity	pint.Quantity	pint.Quantity

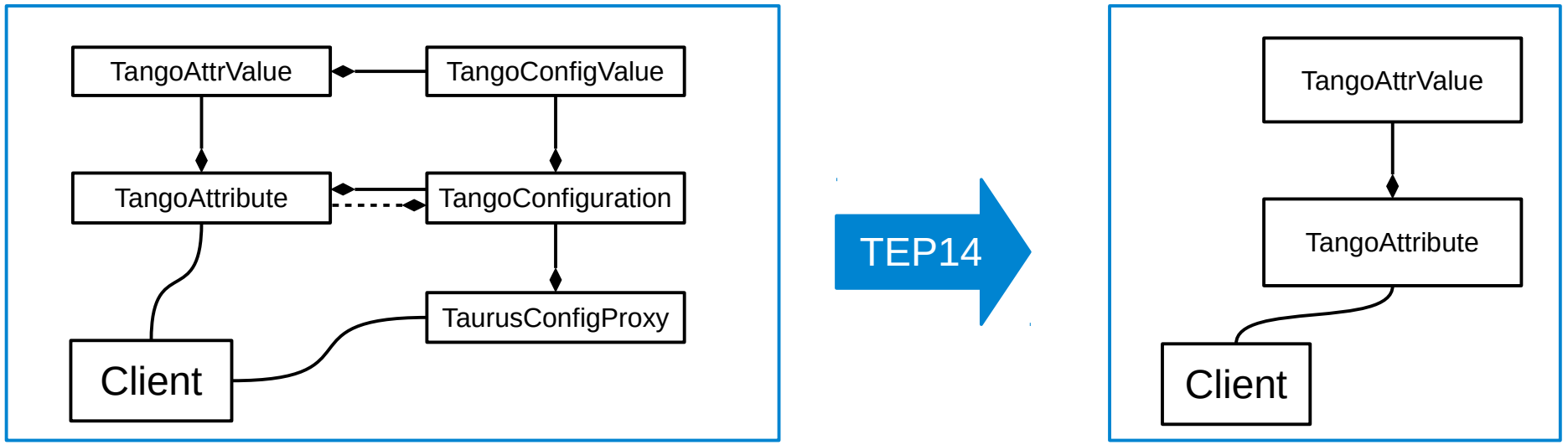
http://pint.readthedocs.org

1st implementation ready in taurus.core of tep14 branch

```
>>> a = taurus.Device('sys/tg_test/1').ampli
>>> a
<Quantity(0.3, 'meter')>
>>> print(a)
0.3 meter
>>> print(a.to('mm'))
300.0 millimeter
```



Merge attribute and configuration objects:



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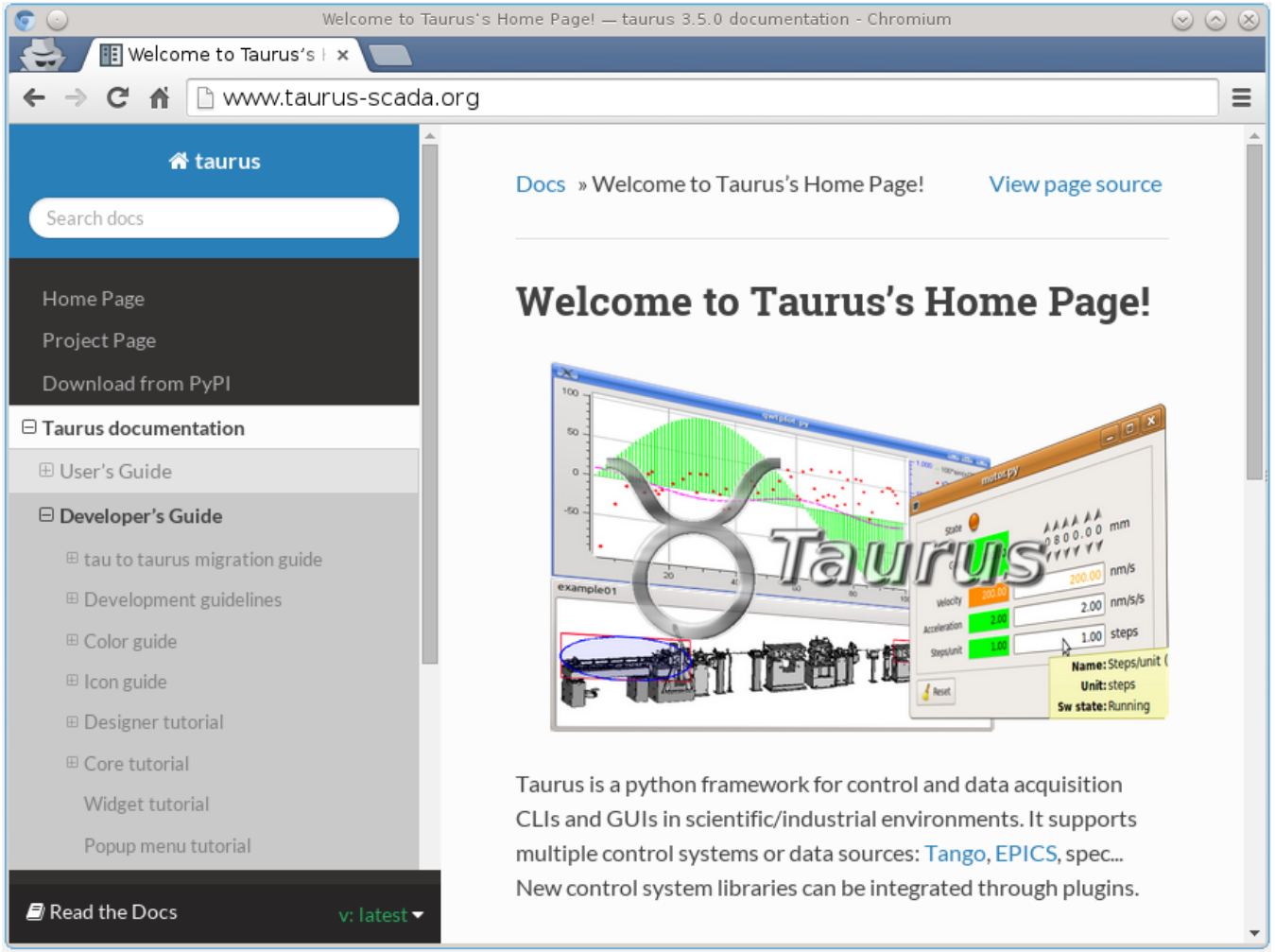
Continuous documentation

http://www.taurus-scada.org
http://www.sardana-controls.org } Hosted in http://readthedocs.org



- Git commits trigger rebuilding of docs
- We can auto-generate docs for any branch (now: stable & develop)
- Pdf and epub versions downloadable
- Improved search & indexing
- Mobile phone friendly

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Avoid obsolescence

PyQwt

- Affects: plots, trends, images,...
- Unmaintained since 2013.
- Urgency: very high
- Migration effort: high (write much code from scratch)
- Migration path: PyQtGraph (eventually Vispy?)
- Ref: http://pyqtgraph.org

Old-style Signals

(and other deprecated APIs)

- Affects: widgets
- Deprecated in PyQt>4.4 ; unsupported in PyQt5 & PySide.
- Urgency: medium-high (no Qt4 in next Debian ~3years)
- Migration effort: medium
- Migration path: support PyQt>4.6 (or go for PyQt>=5 ?)
- Ref: http://pyqt.sf.net/Docs/PyQt5/pyqt4_differences.html

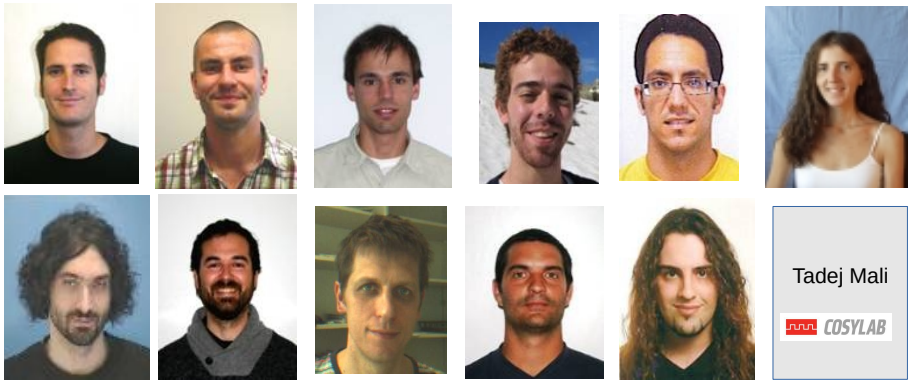
Python2

- Affects: all taurus
- Deprecated but supported till 2020
- Urgency: low
- Migration effort: medium (semiautomatic, mostly needs testing)
- Migration path: support both Python2.7 & Python>3.2
- Ref: https://docs.python.org/3/howto/pyporting.html

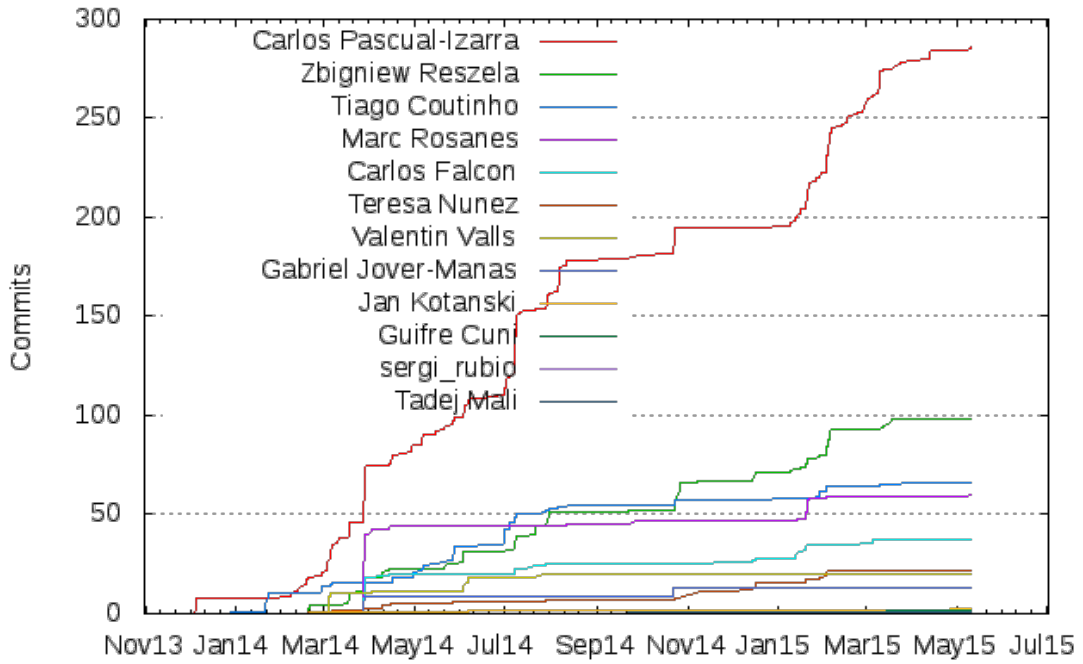
The **community** made it possible

Some figures since Jan14 release

- **3 releases (Jul14, Debian8, Jan15)**
- **9 TEPs being worked on** (4 accepted, 1 being voted, 2 being implemented, 2 being drafted)
- **345 commits to develop**
- **126 tickets** (62 solved)
- **~1800 emails** (~80 of them in users list)



Commits per author since Jan14 release

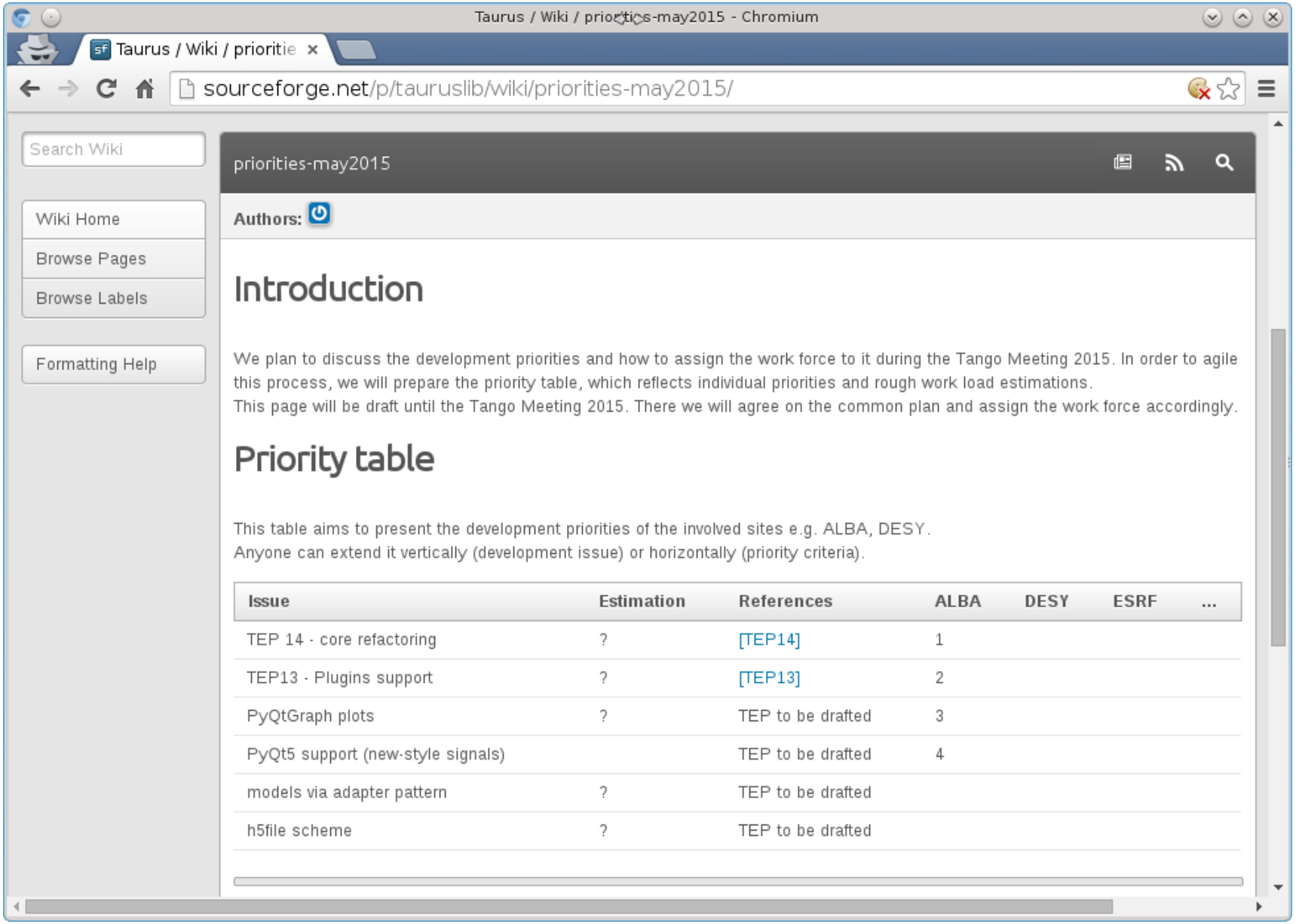


Room for improvement:

- **Integration process:**
  - **devel list is flooded with admin mails**
  - **unbalanced load on integrators**
  - **gerrit could be handy**
  - **review is open, but only integrators currently do it**
- **TEPs should be more agile**

...and special thanks to F. Picca for Debian packaging!

Priorities for next releases



http://sf.net/p/tauruslib/wiki/priorities-may2015/

TEP3: new model syntax

TEP3 requires model names to be proper URIs (RFC3986-compliant)

```
Auth: <scheme>:<authority>[/<path>][?<query>][#<fragment>]
Dev:  <scheme>:[<authority>/]<path>[?<query>][#<fragment>]
Attr: <scheme>:[<authority>/]<path>[?<query>][#<fragment>]
Conf: <scheme>:[<authority>/]<path>[?<query>]#<fragment>
```

Old:	New:
tango://a/b/c/d?configuration=label	tango:a/b/c/d#label
tango://a/b/c/d	tango:a/b/c/d
tango://mydb:10000	tango://mydb:10000
eval://10*{tango://a/b/c/d}	eval:10*{tango:a/b/c/d}
eval://rand(a)?a=12	eval:a=123;rand(a)
eval://dev=Foo;bar()	eval:@Foo/bar()

http://sourceforge.net/p/tauruslib/wiki/TEP3/

multimodels in Taurus

- **Current Situation:**
  - widgets inherit from TaurusBaseComponent
  - base classes assume connection to **just 1 model**
  - Other cases require particular solutions

```
# standard widgets connect to 1 model
e = TaurusValueLineEdit()
e.model = 'a/b/c/d'

# but some parse the name and
# connect to other things!
m = PoolMotorTV()
m.model = 'a/b/c' # but it connects to:
                  #   'a/b/c/pos'
                  #   'a/b/c/state'

# and some widgets receive a list
# to manage it on their own!
f = TaurusForm()
f.model = ['a/b/c/d', 'e/f/g/h']
```

- **Coming (soon?)**: use the **adapter pattern**
  - widgets implemented as a pure Qt
  - model-management methods are inserted by **adapter decorators**
  - Multiple models supported with homogeneous API

```
@modelable('positionModel')
@modelable('stateModel')
class NewMotor(QWidget):
        ...

m = NewMotor()
m.stateModel = 'a/b/c/state'
m.positionModel = 'a/b/c/pos'
```

```
@list_modelable
class NewPlot(PyQtGraph.PlotWidget):
        ...

p = NewPlot()
m.model = ['a/b/c/d', 'e/f/g/h']
```