Sardana Status

40th Tango Community meeting

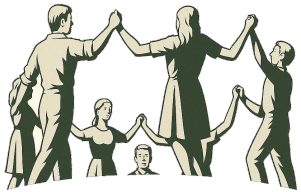
8-10 June 2026, ALBA Synchrotron, Barcelona, Spain

Vanessa Da Silva, Johan Forsberg (MAXIV)
Michal Piekarski (SOLARIS)
Teresa Núñez (DESY)
Alexander Kessler (HI-JENA)
Daniel Schick, Michael Schneider (MBI-Berlin)
Oriol Vallcorba, Jordi Aguilar, Roberto Homs, Zbigniew Reszela (ALBA)

on behalf of the Sardana Community

Sardana - Scientific SCADA Suite

Sardana & Taurus projects



100% Python

Open-source

Modular

Multi-platform

Widely used

Community-driven

Built on top of

TANGO Control System

ALBA

MAX IV LABORATORY

SOLARIS NATIONAL SYNCHROTRON RADIATION CENTRE

DESY.

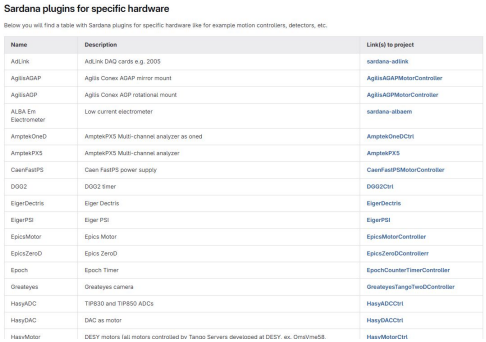
HI JENA Helmholtz-Institut Jena

MBI Max-Born-Institut

Hardware Integration: Sardana Controllers

- Generic controllers (e.g. Sardana Tango Controller, Lima controller)
- Custom controllers (e.g. direct hardware access)

Catalog of plugins



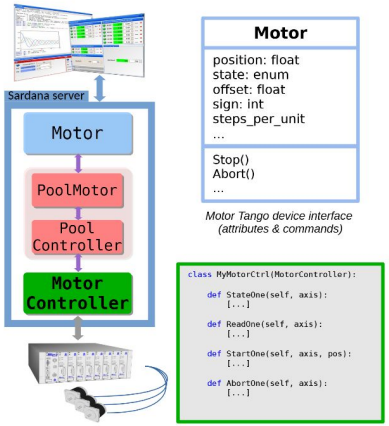
Sardana plugins for specific hardware

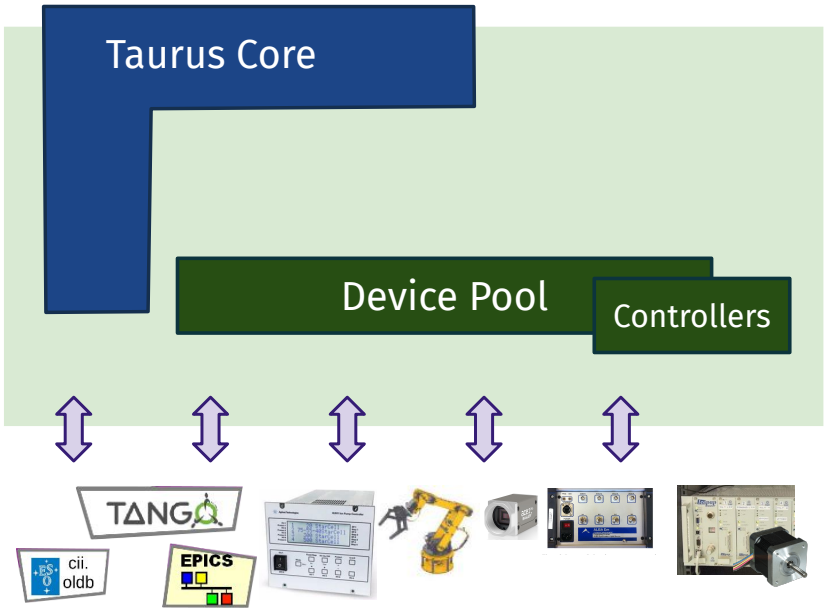
Below you will find a table with Sardana plugins for specific hardware like for example motion controllers, detectors, etc.

Name	Description	Link(s) to project
AdLink	AdLink DAQ cards e.g. 2005	sardana-adlink
AgilisAGAP	Agilis Conex AGAP mirror mount	AgilisAGAPMotorController
AgilisAGP	Agilis Conex AGP rotational mount	AgilisAGPMotorController
ALBA Em Electrometer	Low current electrometer	sardana-albaem
AmptekOneD	AmptekPX5 Multi-channel analyzer as oned	AmptekOneDCtrl
AmptekPX5	AmptekPX5 Multi-channel analyzer	AmptekPX5
CaenFastPS	Caen FastPS power supply	CaenFastPSMotorController
DG02	DG02 timer	DG02Ctrl
EigerDectris	Eiger Dectris	EigerDectris
EigerPSI	Eiger PSI	EigerPSI
EpicsMotor	Epics Motor	EpicsMotorController
EpicsZeroD	Epics ZeroD	EpicsZeroDController
Epoch	Epoch Timer	EpochCounterTimerController
Greateyes	Greateyes camera	GreateyesTangoTwoDController
HasyADC	TIP830 and TIP850 ADCs	HasyADCCtrl
HasyDAC	DAC as motor	HasyDACCtrl
HasvMotor	DESY motors (all motors controlled by Tango Servers developed at DESY. ex. OmsVme58.	HasvMotorCtrl

https://gitlab.com/sardana-org/sardana-extra

Controller API for custom developments. Generic interfaces.





Hardware / Control System

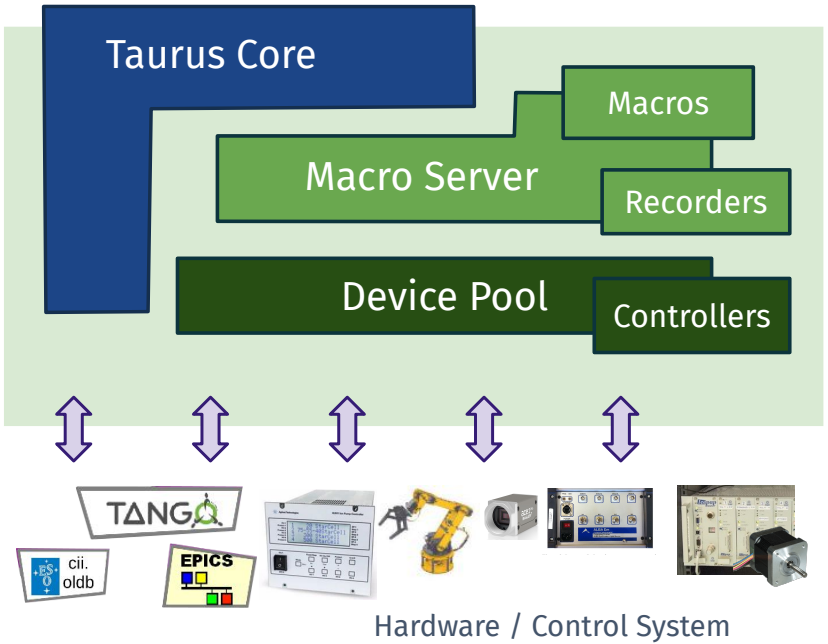
Mid-level abstraction: Sequencing Engine

Macros: Python functions and procedures that can be executed at any time

```
@macro([["position", Type.Float, None, "absolute position"]])
def move_theta(self, position):
    """This macro moves theta to the specified position"""
    th = self.getMotor("th")
    th.move(position)
      self.output("Motor ended at %s", moveable.getPosition())

@macro([["moveable", Type.Moveable, None, "moveable to get position"]])
def fixed_ascan(self, moveable):
    """This does an ascan starting at 0 ending at 100, in 10 intervals
    with integration time of 0.1s"""
    self.ascan(moveable, 0, 100, 10, 0.1)
    scan_id = self.getEnv('ScanID')
    self.output("ScanID is now %d", scan_id)
```

API for accessing Sardana elements or environment

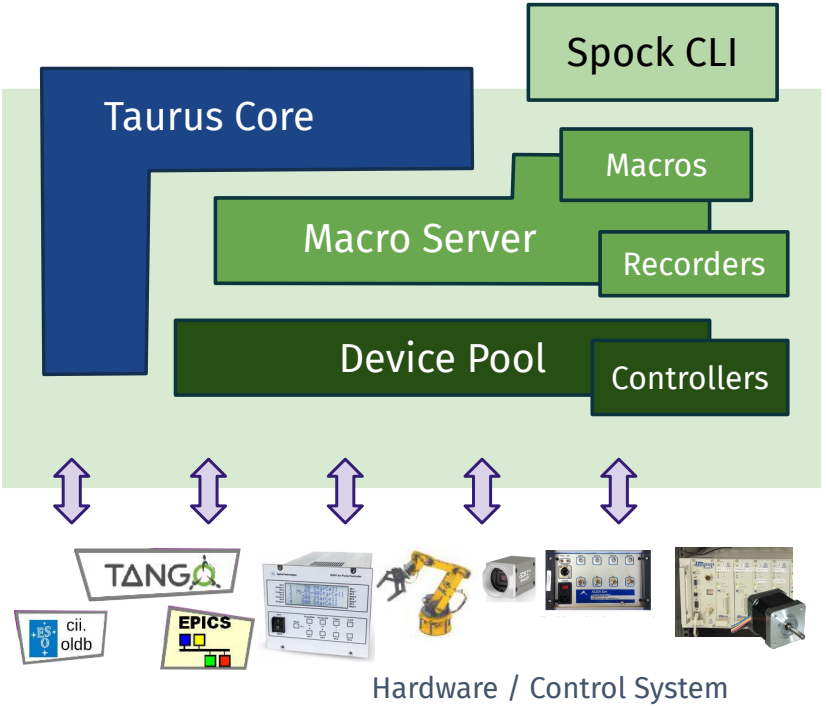
Parameters, result, hooks, data handler (recorders), ...



High-level CLI: Spock

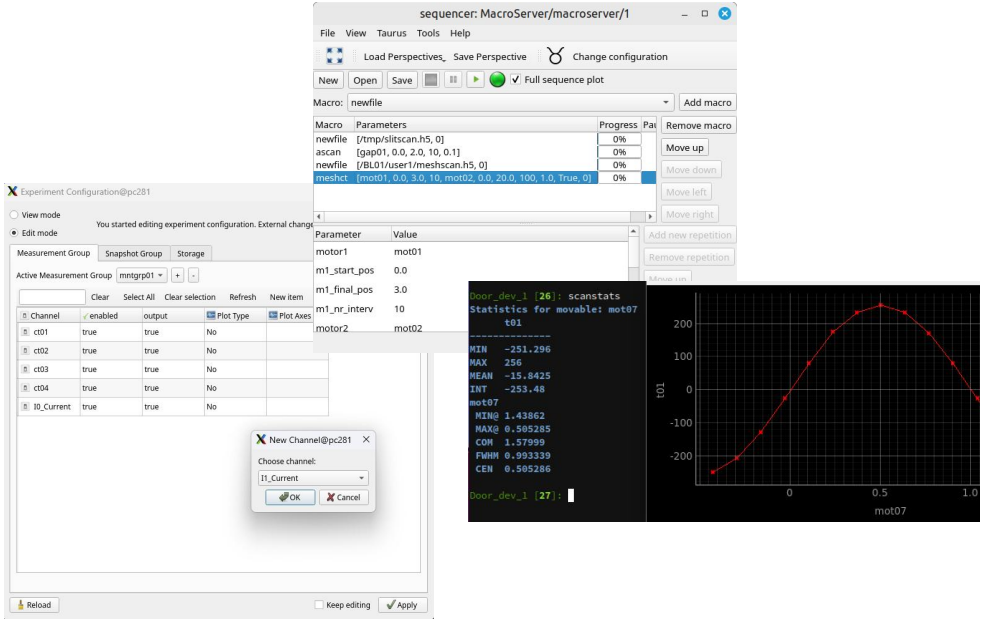
IPython CLI to run macros, commands, open GUIs.

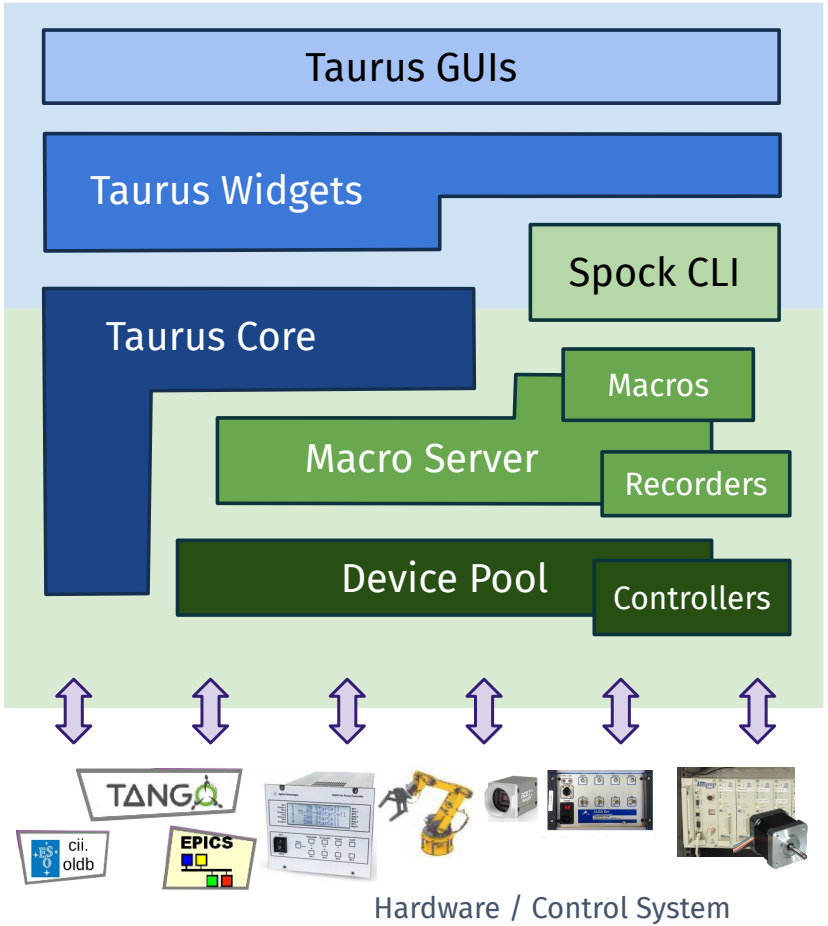
```
Door_macroserver_1 [ 1]: get_meas_conf
ActiveMntGrp  = test_lima_sw
   Channel    Enabled    Output    PlotType    PlotAxes
---------- --------- --------- ---------- ----------
      ct01       True      True    Spectrum       <mov>
  fsm_sim1       True      True          No         n /a

Door_macroserver_1 [ 2]: lsenv
            Name                Value    Type
--------------- ------------------- ------
         ScanDir                /tmp     str
        ScanFile    [ '250922sar.h5' ]    list
          ScanID                 117     int

Door_macroserver_1 [ 3]: ascan mot01  1 5 10 .1
Operation will be saved  in /tmp/250922sar.h5 (HDF5::NXscan  from
NXscanH5_FileRecorder)
Scan #119 started at Wed Oct 29 12:59:51 2025. It will take at least
0:00:03.171697
#Pt No     mot01       ct01     fsm_sim1      dt
  0          1         0.1      file:///tmp/scan_0117/fsm_sim1_0001.edf
0.526816
  1        1.4         0.1      file:///tmp/scan_0117/fsm_sim1_0001.edf
0.892816
…
  9        4.6         0.1      file:///tmp/scan_0117/fsm_sim1_0001.edf   3.7573
  10         5         0.1      file:///tmp/scan_0117/fsm_sim1_0001.edf
4.10957
Operation saved  in /tmp/250922sar.h5 (HDF5::NXscan)
Scan #119 ended at Wed Oct 29 12:59:55 2025, taking 0:00:04.262743.
```



High-level GUIs: Taurus

Experiment Configuration, MacroExecutor, Sequencer, Showscan Online plotting, Taurus Motor widgets, etc...





Sardana Project and Community

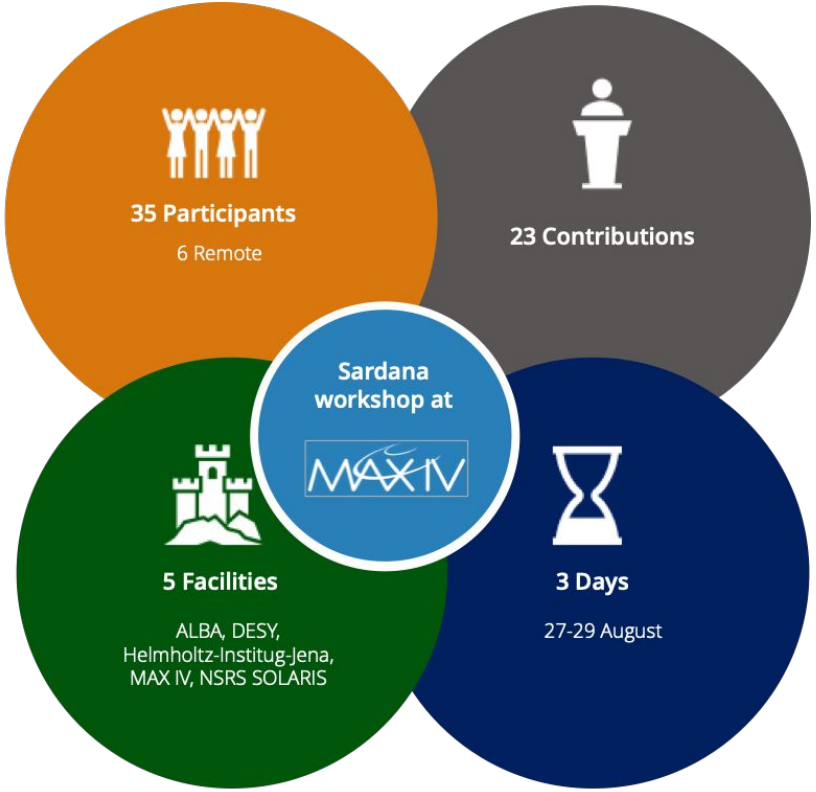
https://sardana-controls.org
https://gitlab.com/sardana-org

- Monthly follow-ups organized by ALBA, DESY, MAX-IV, SOLARIS.
  https://gitlab.com/sardana-org/sardana-followup
- Community Workshops (~yearly)
  - 2023 Continuous Scans Workshop in SOLARIS https://indico.solaris.edu.pl/event/5/
  - 2024 Sardana workshop in Tango Meeting at SOLEIL
    https://gitlab.com/sardana-org/sardana-followup/-/blob/main/20240530-SOLEIL/AGENDA.md
  - 2025 Sardana Workshop in MAX IV https://indico.maxiv.lu.se/event/5634/
  - **2026 Tango Meeting in BCN https://indico.tango-controls.org/event/737**

POWERED BY THE SARDANA COMMUNITY

MAX IV workshop in August 2025

- ✓ Facilities use cases
- ✓ New Features on development
- ✓ Bug Squashing Party
- ✓ Community round table and Roadmap discussion



🎯 Roadmap

Sardana short-term roadmap:

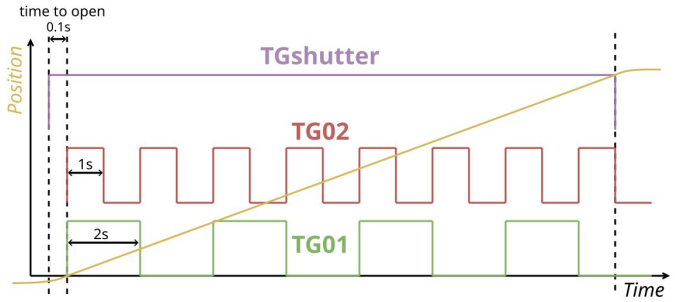
- Redesign **Continuous Scan API** 💡 🚧
  Lessons learned from custom scans, community *hackathon*
- User-friendly **multiple synchronization API** 🚧
- **BlissData publishing** from Pool 🚧 👀
  External data reconstruction (mixed-rate detectors). Scan progress reporting.
- Config tool: include **MacroServer environment** 👀
- **Shutter**: consolidate native support 👀
- Push **Motor archiving** events. Poll when idle. 👀
- Evaluate native **trajectory support** 💡

Sardana Mid-term/backlog: 💡 🚧

- Review **Macro API** - Type hints, more *Pythonic* macro writing
- Simplify ***ExpConf* GUI** - Channel selection, trigger relations 🚧
- **Sequencer** - hooks in plain text, dry-run, retry/resume 💡
- **Reliability** & error-handling tools
- Support flexible workflows for laser facilities ✅
  Custom controller commands
- Linting, standardization & documentation 💡
  Merge-request checklist. Docs reorganization & tutorials ✅

💡 Design
🚧 Implementation
👀 Revision
✅ Finished

🎯 Multiple synchronization descriptions

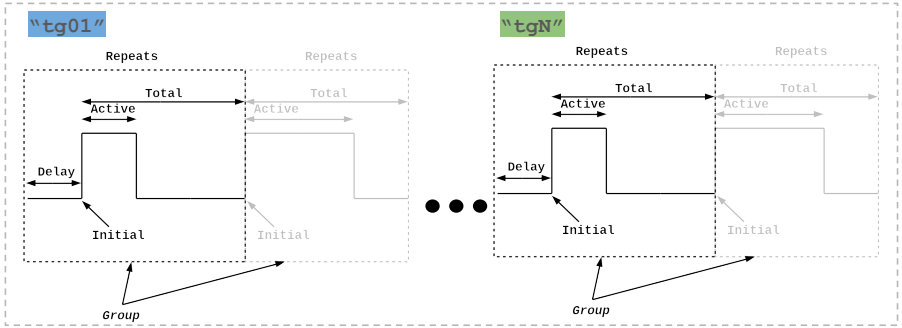


Synchronization description

Synchronizer	Delay (s)	Active (s)	Total (s)	Nr Points
TG01	0,1	2	4	8
TG02	0,1	1	2	4
TGshutter	0	16,1	16,1	1

Measurement Group configuration

Channel	Synchronizer	Synchronization
twod01	TG01	gate
ct01	TG02	trigger
shutter	TGshutter	trigger



✓ Available in **Sardana 3.7**

Now work is focused in improving the API and the tools to use this feature in a user-friendly way

🎯 Custom controller commands

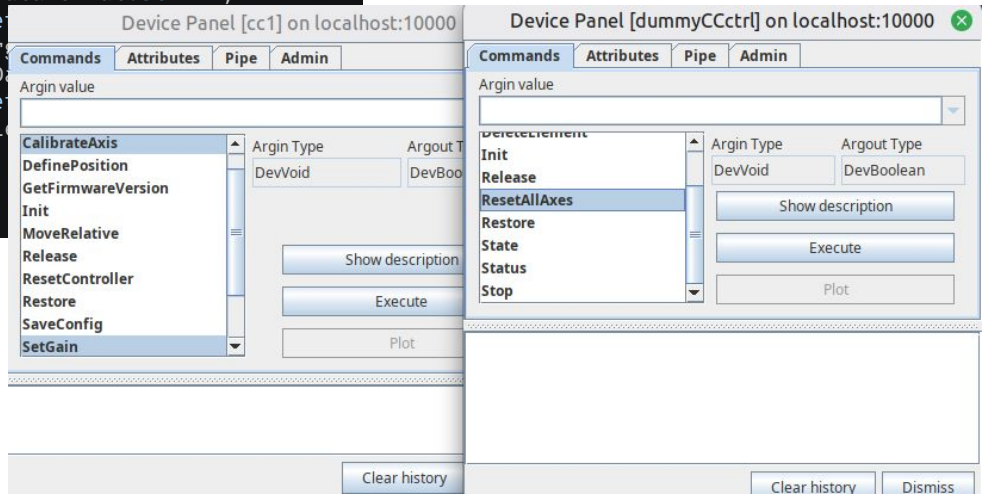
HI JENA Helmholtz-Institut Jena s²innovation

Added support for controller-defined custom Tango commands, exposed on both axis elements and controller devices

✓ Available in **Sardana 3.7**

```
axis_commands = [
    (
        "CalibrateAxis",
        CmdArgType.DevVoid,
        AttrDataFormat.SCALAR,
        "Calibrate this axis",
        CmdArgType.DevBoolean,
        AttrDataFormat.SCALAR,
        "Calibration success",
        DispLevel.OPERATOR,
    ),
    (
        "SetGain",
        CmdArgType.DevDouble,
        AttrDataFormat.SCALAR,
        "Gain value to set",
        CmdArgType.DevDouble,
        AttrDataFormat.SCALAR,
        "Gain that was set",
        DispLevel.EXPERT,
    ),
]
```

```
ctrl_commands = [
        (
            "ResetAllAxes",
            CmdArgType.DevVoid,
            AttrDataFormat.SCALAR,
            "Reset
            CmdAr
            AttrD
            "Reset
            DispL
        ),
    ]
```

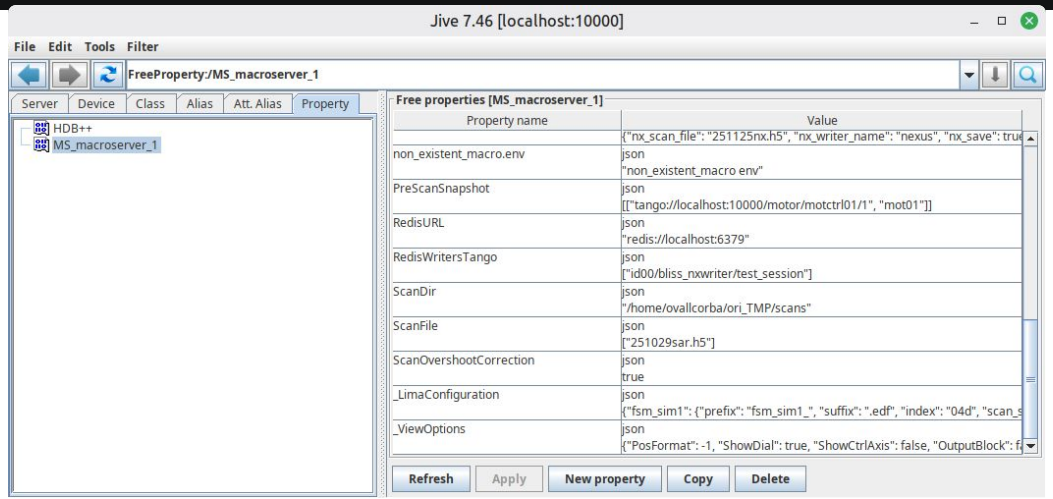


🎯 Add MacroServer Environment backends: Redis and TangoDB

- Global space to store variables persistently to be accessed during macro execution.
- Can be set on different scope: Global, Door, Macro, Door.Macro
- Modified via macros: `senv` and `usenv`
- Before only python `shelve` backend (file)

✓ Available in **Sardana 3.7**

```
Door_macroserver_1 [3]: dumpenv
                  Name                                                                                  Value   Type
                  ----  ------------------------------------------------------------------------------------  ------
          ActiveMntGrp                                                                                test_ct    str
    DataCompressionRank                                                                                     1    int
          JsonRecorder                                                                                   True   bool
    NexusExperimentInfo   {'beamline': 'beamline_id', 'exp_id': 'identifier for the experiment', 'ex [ ... ]   dict
       NexusWriterOpts   {'nx_scan_file': '251125nx.h5', 'nx_writer_name': 'nexus', 'nx_save': True [ ... ]   dict
non_existent_macro.env                                                                  non_existent_macro env    str
       PreScanSnapshot                                [['tango://localhost:10000/motor/motctrl01/1', 'mot01']]   list
              RedisURL                                                                  redis://localhost:6379    str
      RedisWritersTango                                                  ['id00/bliss_nxwriter/test_session']   list
                ScanDir                                                        /home/ovallcorba/ori_TMP/scans    str
               ScanFile                                                                  ['251029sar.h5']   list
ScanOvershootCorrection                                                                                 True   bool
     _LimaConfiguration   {'fsm_sim1': {'prefix': 'fsm_sim1_', 'suffix': '.edf', 'index': '04d', 'sc [ ... ]   dict
           _ViewOptions   {'PosFormat': -1, 'ShowDial': True, 'ShowCtrlAxis': False, 'OutputBlock':  [ ... ]   dict
```



🚀 Last release: **Sardana 3.7** (May 13th, 2026)

- ✓ Added and applied Ruff as linter and formatter of Sardana code
- ✓ Inspector tool in showscan
- ✓ Improvements in expconf (add ScanID control, multiple channel addition, show offline channels)
- ✓ Pixi configuration

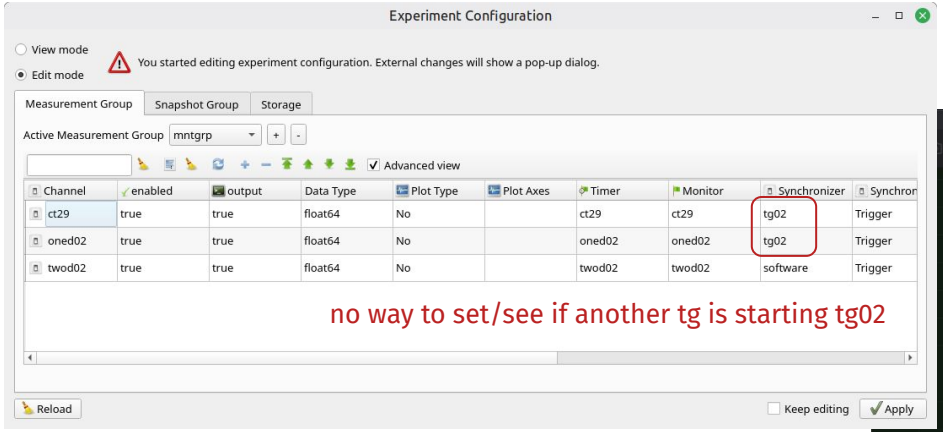
https://gitlab.com/sardana-org/sardana/-/blob/develop/CHANGELOG.md

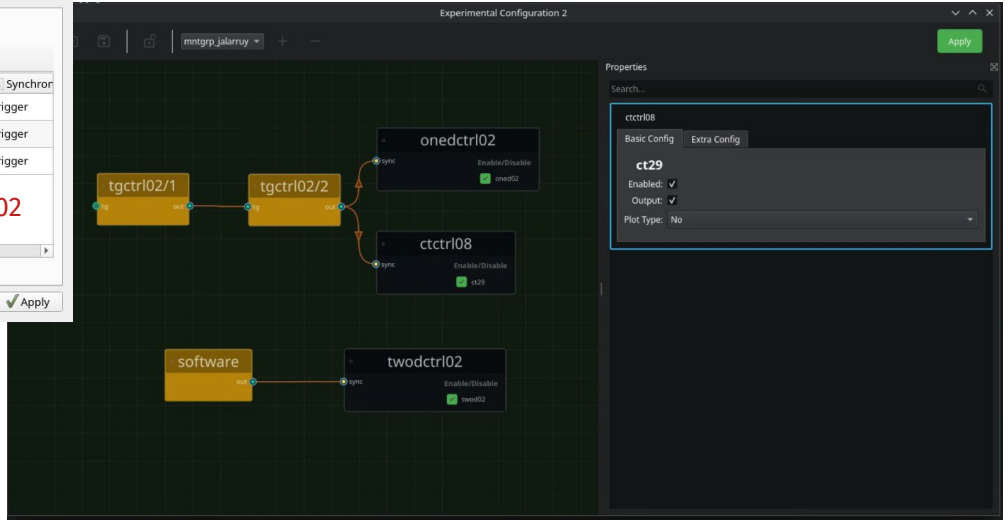
🎯 Simplify ExpConf GUI - Channel selection, trigger relations

- Measurement group **start trigger tree**
- Experiment Configuration GUI v2

to define trigger/gate execution order and parent-child relationships

```
Door_macroserver_1 [2]: get_meas_start_trigger
ActiveMntGrp = mntgrp
  Parent   Child
 ________ ________
    tg01     tg02
```



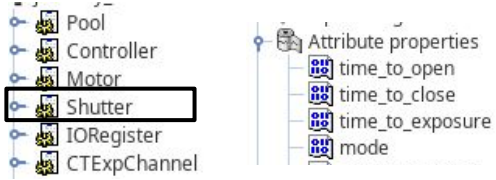


✓ Partially available in develop branch

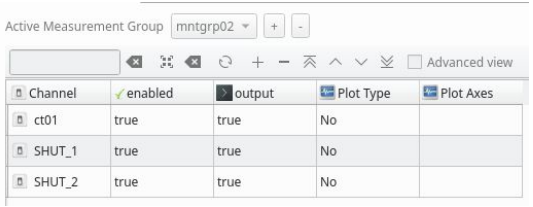
🎯 Shutter: consolidate native support

Calculations added in Sardana Generic Scan Framework so it is compatible with all types of scans and synchronizaiton domains

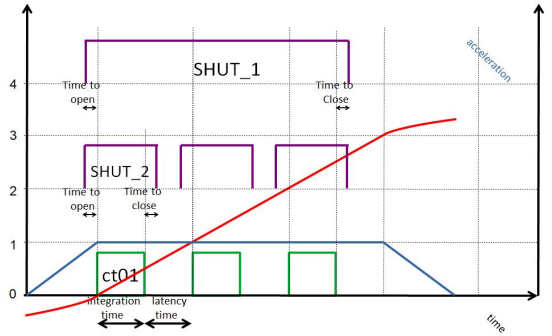
Sardana device with configuration attributes



Measurement Group member

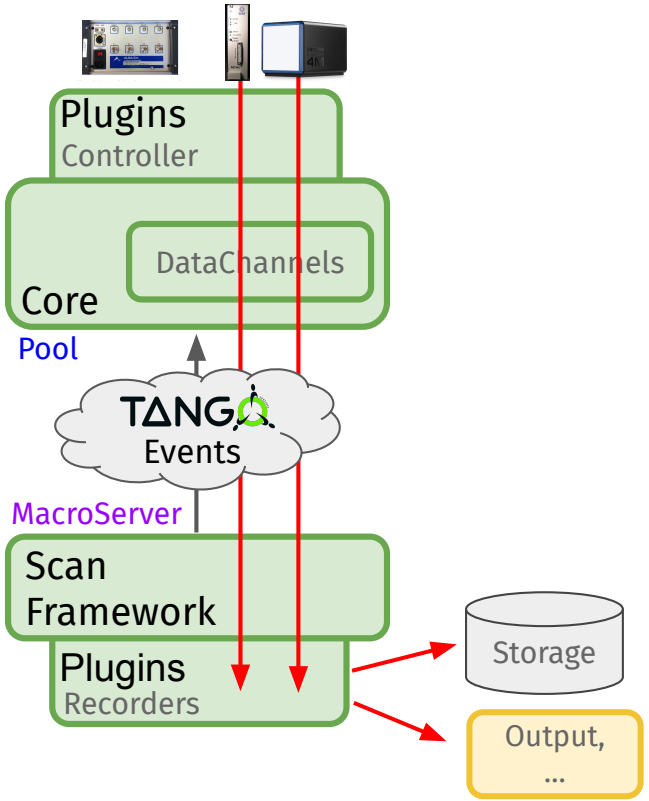


Native software and hardware control using Multiple Synch. Description



✓ Reviewed, tested and ready to be integrated in develop

🎯 Data publication to Redis database

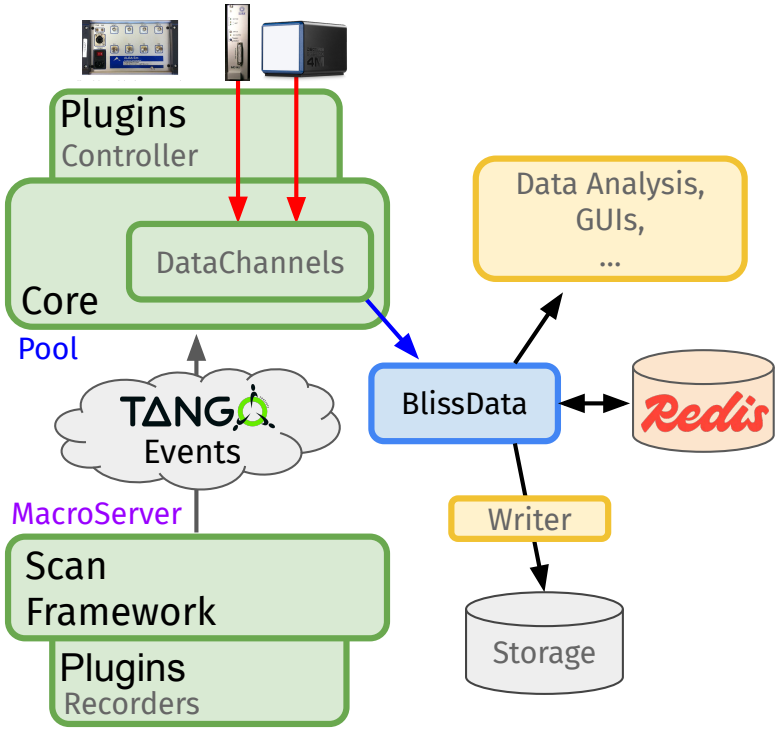


🎯 Data publication to Redis database

Integrate ESRF **Blissdata** in Sardana

Minimize the stress on the MacroServer
Real-time data available for external consumers
Avoid potential bottlenecks in Tango events
Enable external data composition

Also testing implementation via controller capability and publishing data via Tango Device Server

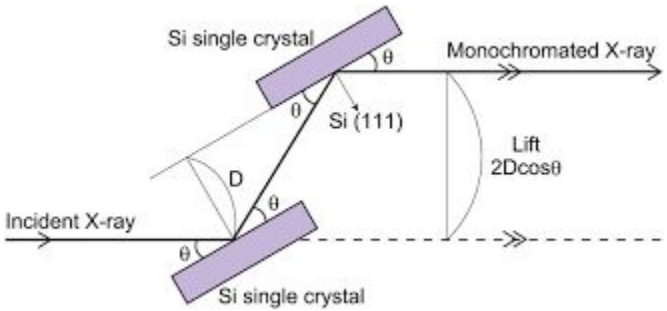


✓ In development & testing

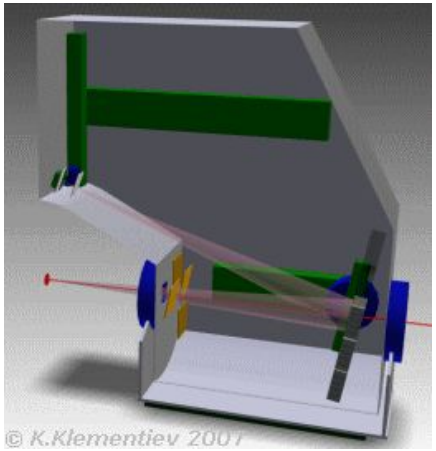
PoC results in Vanessa and Wojciech talk in Sardana Workshop (Thursday)

🎯 Native trajectory Support

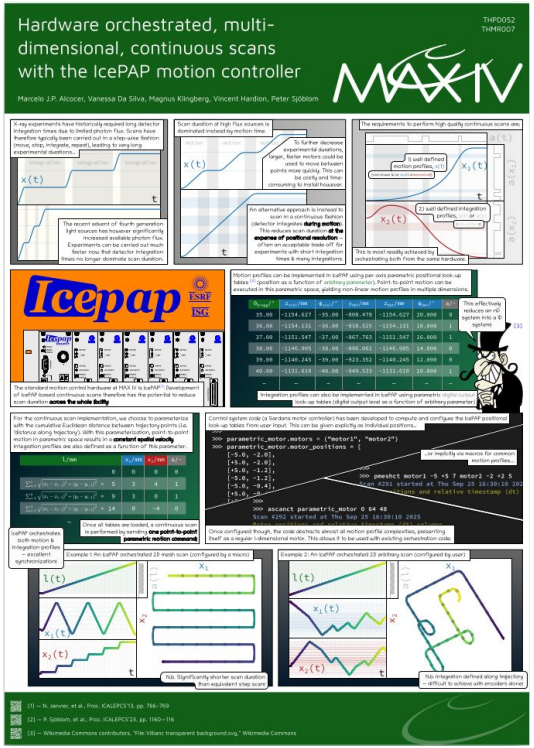
- **Avoid collisions**
- **Increase scan velocity**
- **Dynamic**: meshct, aXscanct, helical, etc
- **Static**: Pseudo-motors



Double Crystal Monochromator



CLEAR Spectrometer
Core Level Emission Analyzer and Reflectometer
(by K. Klementiev)



✓ In design.
PoC in Roberto's talk in Sardana Workshop (Thursday)

Add support for dynamic device level (not class) attributes cppTango#814, cppTango!1652

byte physics

- Sardana exposes many different hardware objects through the same Tango class, for example `Motor`.
- Today, Tango dynamic attributes are added at **class** level.
- This creates conflicts when different devices of the **same class** need attributes with the **same name** but **different configuration** (WriteType, DataFormat, ...).
- Sardana currently works around this by removing conflicting attributes from the class when each device starts, but this is fragile and can affect other devices.
- The proper solution is **support for device-level dynamic attributes**: attributes valid only for one specific device, just like Tango already allows device-level commands.
- This would allow Sardana devices to expose controller-specific capabilities without changing the whole Sardana/Tango class model.

Sardana workshop Thursday and Friday

https://indico.tango-controls.org/event/737

- Facilities reports, dicussion on new features/current WiP, documentation and roadmap
- Sardana Bug Squashing Party – work on open issues (334) and Merge Requests (53).
- Learn from others, contribute to the project and have fun!

Big thanks to all contributors (issues, MRs, commits in last 3y, alphabetical order)

Adrian Justyniarski, Albert Olle, Aleix Puiggali, Alexander Kessler, András Wacha, Antonio Bartalesi, Anton Joubert, asenchenko, Áureo Freitas, Benjamin Bertrand, Carla Takahashi, Canrong Qiu, Daniel Schick, Dmitry Egorov, Elmir Jagudin, Hanno Perrey, Henrique Silva, Ireneusz Zadworny, Isak Lindhé, Jan Kotanski, Johan Forsberg, Jordi Aguilar, José Gabadinho, Jose G. Centeno Gabadinho, Julen Rodríguez, Konstantin Klementiev, Leonid Lunin, Lin Zhu, Lukas Wittenbecher, Marco Leorato, Markus Bala, Martí Caixal, Michał Gandor, Michael Schneider, Michal Piekarski, Miquel Navarro, Oriol García, Oriol Vallcorba, PhilIJC, Roberto Javier Homs Puron, Steven Wohl, Teresa Núñez, Tiago Coutinho, Vanessa Silva, Vincent Hardion, Wojciech Kitka, Wojciech Wantuch, Yimeng Li, Yury Matveev, Zbigniew Reszela

Thank you for your attention!