Migration to Python 3 in SOLARIS

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Reason to migrate

- End of support of Python 2.7 in January 1st, 2020.

- New software does not support older Pythons (right now not even Py3.6)

- More time needed for fixing dependencies versions

Which versions?

- From python 2.7 to python 3.6

- From tango 9.2.5, 9.1, to tango 9.2.5 and 9.3.3

- From taurus 4.0, 4.1, 4.2, 4.3, 4.4, 4.5 to taurus 4.7 (left: taurus 4.5 – standard installation; 3.7 – virtual env)

- From CentOS 7 to CentOS 7 (Fedora 24, CentOS 6, some old Ubuntu/Debian untouched)

What to migrate

- Tango devices
- GUIs
- Other

How to migrate?

- Fix incompatibilities (mostly prints, setup.cfg)

- Import tango instead of PyTango

- Linters (black, isort, bandit, flake8)

- Type hints

- Standardize directory structure and file templates (setup.py/cfg, gitlab-ci, entrypoints, package information)

- Move to High Level API

- Every new project (GUI, script, Tango device) should be in python 3

- For GUIs PyQt4 to PyQt5 or directly to web

- Build python packages for python 3 from PyPI (already in python 2)

Very helpful

- Gitlab CI/CD (building rpm packages and sending them to repo with simple switch of container responsible for building python packages)

- fpm for building dependencies from PyPI.

- Define properly dependencies

- Plan with some spare time for bugfixes

- Coordinate with other teams for tests

- Split work into groups and days

Problems

- Possible updates and tests mostly on shutdowns

- Parallel maintenance and development of software for machine and beamlines

- No automatic tests for Tango Devices

- Personnel changes

- Very old software that no one remember (old API, spaghetti code)

- If something works with old software but doesn't with new (even the reason is not the software)

- Python 3.6 is already deprecated

- In some cases update of Tango devices is connected to update of GUIs

When we started

- Most of the devices very ready at the end of the summer 2020.

- Migration was scheduled to winter shutdown 2020/2021

Where are we now

- Most of the Tango devices migrated (also Sardana)

- Still some devices not migrated, e.g. Gamma classes for ion pump controllers which have problem with hanging hardware running on older firmware – vacuum group doesn't want to upgrade firmware (even making reading outputs faster)

- Some new GUIs already in Python 3 or on web but most of them are Python 2

- Archiving API (dependency for web) is still Python 2 (using PyTangoArchiving)

- Now we have Taurus 3.7, 4.1, 4.5 and 4.7

Plans for the future

- Migrate rest of the devices to Python 3.6

- Migrate GUIs and scripts to Python 3.6

- Upgrade Tango and consolidate versions

- Migrate to different Linux (probably Alma 8, maybe 9)

- Migrate to Python 3.x

- Write tests

Thank you