

Fedora Astronomy

The benefits for astronomical software from integration into Linux distributions

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June 27, 2018



History of Fedora Astronomy



2003	Fedora has been founded, successor of Red Hat Linux, some basic packages like cfitsio right from beginning
2008	Fedora SciTech Special Interest Group (SIG) has been founded Fedora Astronomy SIG has been founded
2008 -	Packaging of many important astronomical software
2016	Fedora Astronomy Lab released with Fedora 24

As many packages and tasks are not unique to a specific scientific domain:

- Fedora SciTech (Science & Technology) SIG has been founded
- Takes care of packaging of general packages, e.g. Python SciPy-Stack, TeXLive and Sage
- Package groups for scientific applications
- Handles questions like handling of BLAS/LAPACK implementations
- Contact for user questions
- https://fedoraproject.org/wiki/Category:SciTech_SIG



The Astronomy SIG works on top of SciTech:

- Takes care of software and tasks specific for astronomy
- Creates ready to use live environment (installable): Astronomy Lab
- Coordinates collaboration with other distribution projects
- Fedora is “bazaar” style: everyone can follow and contribute, development is transparent, currently 4-5 active members
- Point of contact for users (Mailing list, IRC etc.)
- **Important: Be interesting for both amateurs and professionals**
- https://fedoraproject.org/wiki/Category:Astronomy_SIG

Why should astronomical software be part of the distribution?

- Fair question
- We have distribution (or even OS-) independent approaches like conda and PyPI/pip (for Python)
- These approaches don't care about distribution specific stuff like SELinux at Fedora
- Requirement for creation of a Spin/Lab, a preconfigured, installable live distribution
- User should be able to work with just one software management application like APT or DNF

Advantages of packaging within a Linux distribution

- Clear packaging guidelines, e.g. well defined set of compiler flags
- Proper check of licensing
- Complete builds from source, no convenience copies of libraries etc.
- Availability for many architectures (currently 7 in Fedora)
- Team maintainance
- Continuous Integration (CI), automatic rebuilds and test execution on dependency changes (e.g. updates)
- Ensure compatibility with the base operating system (common issue with ESO Scisoft)

Which software should be (not) shipped by a Linux distrib.

Ship:

- software which people need to work with your data/services
- software of more general interest, e.g. photometry pipeline
- in a stable state, e.g. no big API changes

Not ship:

- software very specific to your project which is not made for the end user (e.g. internal data processing pipeline). But providing the source in some Git repo is still nice :)
- software in heavy development with changing interfaces etc., as at least some distributions have quite strict update guidelines and an old version might be shipped for a long time
- If you still want to package these: Use a service like Fedora Copr or Open Build Server (→ later)

Most important and prominent packages

- Astropy and affiliated packages (e.g. ccdproc and photutils) in addition to the common SciPy-Stack, supports both Python 2 and Python 3
- AstrOmatic software (psfex, scamp, sextractor, swarp)
- astrometry.net plate solver
- cfitsio, ccfits
- CPL (ESO Common Pipeline Library)
- Ginga FITS viewer
- healpix (C, C++, Fortran, Java) and healpy
- PyVO (Python 2 and 3) for VO support
- wcstools
- wcslib

Important missing packages

Sadly some very important packages are missing in Fedora (or even most Linux distributions)

- IRAF
 - (Almost) no upstream support, Github project archived
 - Packaging community fork adapting IRAF for modern Linux systems and replacing nonfree NR code (most work done by Ole Streicher, Debian project) <https://github.com/iraf-community>
 - Some parts not usable anymore (e.g. X11IRAF) as they are 32 Bit only
 - Currently going through Fedora package review, already in Debian (testing)
- DS9
 - Mostly done, many bundled libraries
 - Good upstream support
 - Currently waiting for approval by Fedora Legal as it contains an MPEG encoder
- Non-official builds already available

How new software gets pushed to Fedora

- F Astronomy members check for new stuff at ASCL and astropy (new affiliated packages) regularly
- New packages are introduced in well-defined review process
 - Check for compliance with packaging guidelines
 - License check
 - Ensure proper packaging style in addition to guidelines, e.g. ensure that provided tests are executed
- Package gets added to the distribution
- Packages become part of astro-sig package group to ensure that all SIG members have access and loss of single contributors can be compensated

General packages

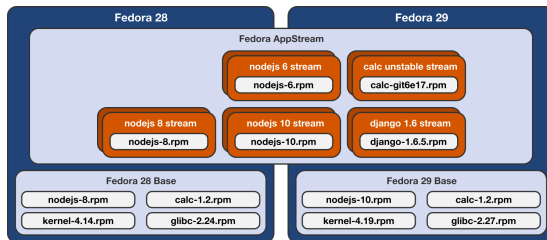
- DS9 (packaged, some patent related stuff waiting. . .)
- IRAF (packaged, in review process)
- PyRAF (packaged, but depends on IRAF)

VO packages

- Aladin (mostly done)
- DaCHS (in progress, latest release contains necessary changes)
- TOPCAT (packaging of dependencies started)

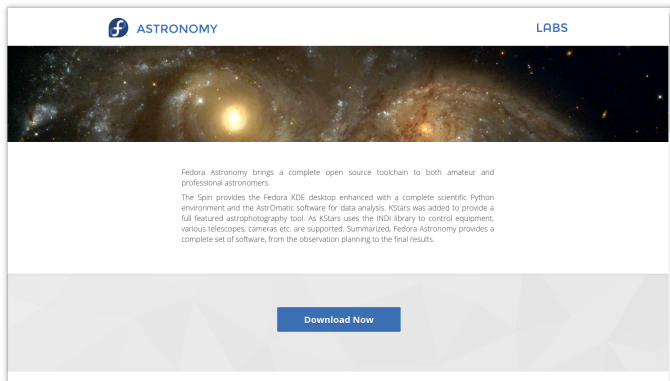
Integration with Fedora Modularity, a new feature of Fedora

Fedora Modularity



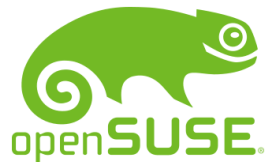
- Different users have different needs. Developers want latest versions possible, administrators want stability for longer period of time.
- Users can now keep their operating system up-to-date while having the right version of an application for their use case, even when the default version in the distribution changes





- Ready to use Fedora live environment (based on Fedora KDE)
- Astropy + affiliated packages, IPython, AstrOmatic, INDI, much more
- <https://labs.fedoraproject.org/astronomy/>

Connection to other distributions



- Close collaboration with other distributions useful
 - Packaging guidelines quite similar
 - Many common tasks like library unbundling, license checks avoid duplicated work
 - Combined efforts have more power
 - More weight at discussions with upstream projects
- Close cooperation between Debian Astronomy and Fedora Astronomy since 2015
- Initially very close collaboration with Mageia

Package and repository services by distributions



- Sometimes you want to provide newer/modified versions or you think you're stuff is not yet ready for release but for testing
- Some distributions provide build and repository services for that
 - Fedora Copr
 - openSUSE Build Service
 - Ubuntu Launchpad/PPA
- Multi-distribution packaging possible in a common build infrastructure, openSUSE Build Service (OBS) supports RPM, Deb and Arch Linux



- Packaging of many important astronomical software packages for years
- Ready to use Fedora Astronomy Lab
- Well defined packaging and distribution process
- Proper collaboration with other projects like Debian Astronomy
- Future: Work on Fedora Modularity
- Future: Try to unify and enhance packaging for more distributions to get a unified experience over the most important distributions (Debian universe and RPM universe)

Thank you for your attention!



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