The GNOME Conference

GUADEC

Showing Up for Python in GNOME

Dan Yeaw (dan@yeaw.me)

About Me

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- Originally from California, now lives in Michigan
- Co-maintainer of Gaphor, SysML/UML Modeling tool (GNOME Circle)
- Co-maintainer of Gvsbuild for building GTK on Windows
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Hi, I'm Dan Yeaw, and I'm sooo excited to talk to you about Showing up for Python in GNOME!!

Unleashing Interests with Python

```
>>> import pypokedex
>>> pokemon = pypokedex.get(name="Decidueye")
>>> pokemon.name
'decidueye'
>>> pokemon.types
['grass', 'ghost']
>>> pokemon.base_stats
BaseStats(hp=78, attack=107, defense=75, sp_atk=100, sp_def=100)
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With a little help, my 10 year old son can figure out how make simple games and apps with it, his latest project is trying to make a Pokedex for Pokemon. He loves geeking out on Pokemon, and that it is so much fun to see people get deep in to their interests!

Python is easy to learn, but hard to master - it scales easily with your skillset. It is such an important language for our ecosystem. It is often used by students, researchers, and non-professional programmers. It is used by artists, data scientists, web developers, sysadmins, and astronomers.

With Builder, Workbench, and Flatpak, it has never been easier to build an app for GNOME. This is the big tent, that we need, where we make room for and make it easy for all kinds of people to build small apps for their projects to geek out on their interests. Python is the perfect language this - so we need to make sure the GNOME experience with it lives up to this.

GNOME Python

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On Python

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In December 2022, Emmanuele Bassi wrote a blog post called On Python with a call to action to get involved to help Christoph.

Commits Over Time

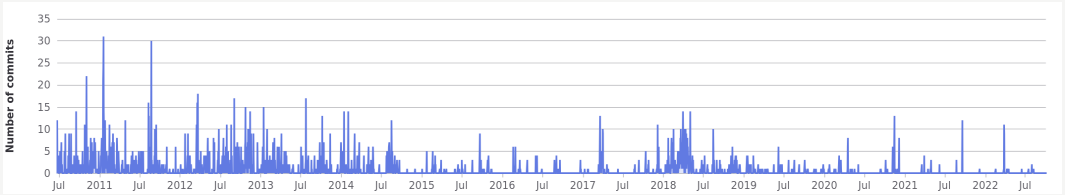

Figure 1: PyGObject Commits Over Time

- Major contributors like Simon Feltman, John Palmieri, and Martin Pitt left the project.
- Christoph Reiter heroically held things together since 2017.
- However, the number of changes started to fall off, especially after 2020.

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Getting Involved in an Undermaintained Project

- Contributing to an undermaintained project can be difficult
- Each extra contribution is placing a burden on the developer
- Timely feedback to contributions is often not possible
- To outsiders GNOME as a project can sometimes feel hard to join, especially in these undermaintained areas

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Wow! The GNOME Project Handbook which was released at the end of January. is such a special resource to document for everyone how to get involved and the expectations. A big shout out to the team whole helped make that happen!

Since GNOME as a project is made up of volunteers and individuals paid by companies with their own priorities, it can often be difficult to shift resources to help out a part of the ecosystem. Emmanuele shouldn't have to write blog posts asking for people to help get involved. There may be an opportunity for the GNOME Foundation here to track the health of key GNOME projects using metrics and then provide community building support for those that are starting to have challenges to help them out before it becomes an issue.

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A clean issue backlog is important for a thriving community. We made some major in roads over the last year to reduce the total open issue and merge request counts.

https://pygobject.gnome.org

Screenshot here!

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We use to have the pygobject docs hosted on read the docs. Rafael Mardojai also had a really nice PyGObject-Guide which was a tutorial based on the Python GTK+3 Tutorial by Sebastian Pölsterl. We worked with the communities to convert the projects from the GNU Free Documentation License to the LGPL, merged the tutorials with the other docs, and moved them to a more official pygobject.gnome.org subdomain.

Fundamental Types

```python
def on_pressed(ctrl, n_press, x, y):
    print(ctrl.get_current_event())


def window():
    ctrl = Gtk.GestureClick()
    ctrl.connect("pressed", on_pressed)
    win = Gtk.Window.new()
    win.add_controller(ctrl)
    win.show()
    return win
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```

Now Python developers can finally use instances of fundamental types, which was one of the big blockers for people implementing custom widgets with GTK4. This original work was starting in 2010, and Arjan Molenaar brushed it off and implemented it this year.

This fixes a ton of low level issues. you'll be able to do advanced custom drawing using render nodes, as well as accessing low level windowing system event objects, in your Python applications.

meson-python and PDM

```
meson setup _build
meson test -C _build
```

or

```
pdm install
pdm run pytest
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We moved from the legacy setup.py to the more modern pyproject.toml. We are using Meson for the build backend and using PDM to manage the project dependencies and virtualenvs.

Modernize API Docs

- Modernize building docs using GI-DocGen and Sphinx

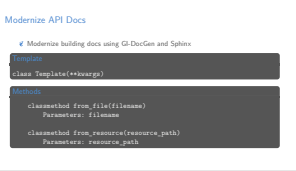
Template

```
class Template(**kwargs)
```

Methods

```
    classmethod from_file(filename)
        Parameters: filename

    classmethod from_resource(resource_path)
        Parameters: resource_path
```

Just like many other libraries have been upgrading from GTK-Doc to GI-DocGen, PyGObject also recently made the switch. GI-Docgen reuses the introspection data generated by GObject-based libraries to generate the API reference of these libraries.
Previously, we were using pgi-docgen, which was a more custom way to read GIR docs and then create a Sphinx website from them.

Previously missing documentation, like for Gtk.Template is now available and because we are using the introspection data directly less maintenance is required going forward.

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Experimental: Asyncio Integration

- Implements Python asyncio await for Gio async results

```
async def idle_test():
    bus = await Gio.bus_get(Gio.BusType.SYSTEM)
    # Actual bus call requires more paramters
    await bus.call("org.freedesktop.NetworkManager")

policy = GLibEventLoopPolicy()
asyncio.set_event_loop_policy(policy)
loop = policy.get_event_loop()
loop.run_until_complete(idle_test())
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Wheels for Windows

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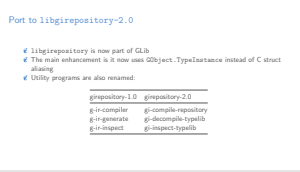
For security reasons, Python 3.8 stopped automatically loading DLLs on the path on Windows. Many libraries including PyGObject previously depended on this behavior. If you do build GTK on Windows using Gvsbuild or with MSVC directly, you don't end up with a working PyGObject without manually loading the DLLs or patching PyGObject.

We have discussed options to fix this, and there hasn't been much excitement in adding a DLL search routine in PyGObjects startup code. However, a Wheel format allows for DLLs to be bundled along side of the project though and then they are automatically loaded. This would also significantly improve install time as well, since users can directly install a pre-compiled version of PyGObject instead of compiling it during the installation.

Port to libgirepository-2.0

- libgirepository is now part of GLib
- The main enhancement is it now uses GObject.TypeInstance instead of C struct aliasing
- Utility programs are also renamed:

girepository-1.0	girepository-2.0
g-ir-compiler	gi-compile-repository
g-ir-generate	gi-decompile-typelib
g-ir-inspect	gi-inspect-typelib



This one is more of a chore to make sure that PyGObject is using the latest libraries. libgirepository was originally part of gobject-introspection, however it is now very stable and has been integrated with GLib to improve the build process to prevent circular dependencies between GLib and gobject-introspection.

The main change between the two versions of libgirepository is that it now uses GObject.TypeInstance as the basis of its type system, rather than simple C struct aliasing.

The symbol prefix was also updated from g_ to gi_, various function arguments changed, and there were some modification to stack allocation.

Philip Withnall started this work to port PyGObject, and Arjan Molenaar has picked it up to try to bring it home.

Move API Docs

- Combine and merge the API docs to https://pygobject.gnome.org
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- Submit and help triage issues
- Continue to help us improve the docs
- Help us fix bugs and implement features
- Add examples to Workbench
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Many of you have even more ideas on what we could improve next, and we would love to have your contributions!