

The GNOME™ Conference GUADDEC

Showing Up for Python in GNOME

Dan Yeaw (dan@yeaw.me)



About Me



- 🐾 Dan Yeaw (pronounced: Yaw)
- 🐾 Originally from California, now live in Michigan
- 🐾 Gaphor, Gvsbuild, PyGObject

2024-07-20

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About Me

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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!! For my day job I work on Functional Safety at Ford Motor Company in Functional Safety, which helps ensure that complex software systems don't malfunction and cause harm. As part of this, I model the behavior, structure, and requirements these systems need to have as part of the rigor we apply to the system design.

About 6 years ago, I started to get involved in a Python GTK app called Gaphor - with the goal of being able to do this systems modeling with an open source tool. Gaphor is now a GNOME Circle app for doing SysML and UML modeling.

I took over hosting Michigan Python to learn and collaborate with others using Python.

I also got involved in Gvsbuild to help fix pain points with running Gaphor on Windows. Finally I got more involved in PyGObject over the last year to help it thrive, and that's what this talk will be about.

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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└─ Unleashing Interests with Python

With a little help, my 10 year old son can figure out how make simple games and apps with Python, 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, Cambalache, 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.

Unleashing Interests with Python

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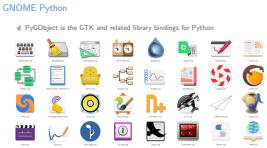
GNOME Python

PyGObject is the GTK and related library bindings for Python



Showing Up for Python in GNOME

GNOME Python



PyGObject is Python in GNOME. It is the successor to PyGTK that James Henstridge started in 1998 that uses gobject-introspection directly to allow you to build GNOME apps using Python. If you see the patterns in the app icons here, those deep interests that people geek out on includes drawing and art, modeling, graphing, music, genealogy, manga, classic gaming, and scientific reports.

On PyGObject

The current state of the Python bindings for GObject-based libraries is making it really hard to recommend using Python as a language for developing GTK and GNOME applications.

Emmanuele Bassi (2022)

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└ On PyGObject

On PyGObject

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Emmanuele Bassi (2022)

In December 2022, Emmanuele Bassi wrote a blog post called “On PyGObject” with a call to action to get involved to help Christoph Reiter, the maintainer of the library. He went through 3 large use cases of features missing in PyGObject which was really make it hard to recommend. These included:

1. Typed Instances for things like GtkExpression, GtkRenderNode, and GtkEvent. These Foundational Types weren’t supported since they aren’t based on GObject.
2. The base wrapper for GObject itself is written in Python instead of using gobject-introspection directly. However, this means that constructing and disposing of objects can be difficult because PyGObject doesn’t automatically get access to the functions for doing those operations.
3. Documentation is spread out everywhere, and a lot of it wasn’t updated for GTK4.

Commits Over Time

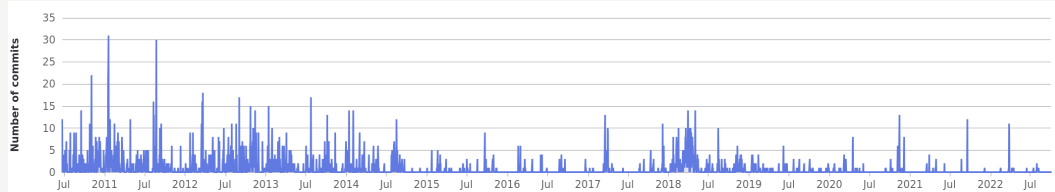


Figure 1: PyGObject Commits Over Time

- 🐾 Major contributors left the project over time.
- 🐾 Christoph Reiter heroically held things together since 2017.
- 🐾 However, the number of changes started to fall off, especially after 2020.

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└─ Commits Over Time

Commits Over Time



Figure 1: PyGObject Commits Over Time

- 🐾 Major contributors left the project over time.
- 🐾 Christoph Reiter heroically held things together since 2017.
- 🐾 However, the number of changes started to fall off, especially after 2020.

You can see the pattern of this in the commit history, although it isn't the only or even most important indicator of community health. Major contributors like Simon Feltman, John Palmieri, and Martin Pitt left the project - which is a natural part of open source. Christoph kept the fires burning late in to the nights, but he was also working on other important open source projects like MSYS2. PyGObject was mostly idling along with absolutely necessary changes only. This is also the same time frame that GTK4 was released, so there was a lot of changes going on in the wider ecosystem of libraries.

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, the GNOME project can feel hard to join, especially in these undermaintained areas

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└ Getting Involved in an Undermaintained Project

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Major open source projects really need a contribution funnel to get more people involved. This type of community building requires many hands to help newcomers, triage issues, review contributions, answer questions, and provide support.

Unfortunately, it is all too common to have one person trying to hold everything together on multiple projects. However, this is a catch-22, that one person is barely holding things together, and each issue raised, each merge request submitted is extra work and burden for them.

It doesn't feel welcoming to new people if they show up to help and their contributions dead rot, it is natural to move along and spend your time on things that you feel are making a difference.

Since GNOME is a whole project and developer access is across the project, this adds an extra layer of complexity to try to figure out how to get through. For an undermaintained project, it can feel like the GNOME community is behind a city wall, and your knocking on the unmanned gate trying join.

Community Building



- 🐼 The GNOME Project Handbook greatly improves clarity on how to get involved
- 🐼 The GNOME Foundation could also take a greater role

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Showing Up for Python in GNOME

└ Community Building

Community Building



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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.

The State of Python in GNOME

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└─ The State of Python in GNOME

The State of Python in GNOME

Let's switch gears a bit, over the last year, PyGObject has made some significant improvements!

Issue and Merge Request Triage

- 👉 Closed about 200 issues
- 👉 Total issue count went from over 300 to 175
- 👉 Open or draft merge requests went from 30 to 19

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Showing Up for Python in GNOME
└─ The State of Python in GNOME

└─ Issue and Merge Request Triage

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Let's start with the basics! A clean issue and merge request backlog is important for a thriving community. We made some major inroads over the last year to reduce the total open issue and merge request counts.

Although we haven't quite got all the way to just the subset that we are really going to work on, issues in this 100-200 range feels good - something that contributors can get their head around. Much more than this often feels overwhelming.

Fundamental Types

- 🐾 Most objects inherit from GObject
- 🐾 GtkExpression, GtkRenderNode, and GtkEvent do not
- 🐾 These are defined as a `GObject.TypeInstance`

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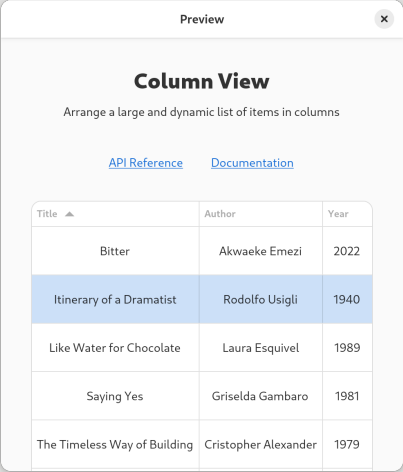
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└─ The State of Python in GNOME
└─ Fundamental Types

Fundamental Types

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- 🐾 These are defined as a `GObject.TypeInstance`

GObject is the base type system and object class and is used for most of GTK and related libraries. Types are the fundamental part of a programming language like C, to translate a type like a char to the machine architecture with a minimum size like 8 bits and a maximum size. GLib provides a type system for GTK related libraries. Most of these types are fundamental types that are instantiated by GLib automatically, like a gchar. Most objects are created by inheriting from GObject to get memory management, properties like getters and setters, and construction/deconstruction of instances. However, not every piece of data used in a GTK application needs all that. So other fundamental types are created by defined by Gtk by defining a class and instance structure. Up until recently, PyGObject didn't support making use of these Fundamental types for data in your program like Expressions, RenderNodes, and Events. Let's jump in to an example!

Workbench Column View Example



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- └ The State of Python in GNOME
- └ Workbench Column View Example

Workbench Column View Example



Workbench is this great app for learning and prototyping GNOME apps created by Sonny Piers and lots of contributions from the community to create tutorials in Vala, Python, Rust, and Javascript - I highly recommend it!! Here you can see the ColumnView example. ColumnView was added in GTK4 as an easier way to create a table of data. Here is a list of books with title, author, and year. You can sort the columns by clicking on the column header, and also select a row which is shown in the light blue. For Gaphor, I would like to integrate a table view of MBSE diagrams for doing analysis. So I really wanted to make use of a ColumnView.

Sorting

- 🐼 Gtk provides an easy way to sort columns
- 🐼 Create a `Sorter` and then pass in a `Gtk.PropertyExpression`
- 🐼 `this -> item -> property`
- 🐼 Unfortunately, it isn't so easy without Fundamental Types

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- └─ Sorting

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As we saw in the `ColumnView`, being able to click on a column header to sort it is important or even expected functionality. For strings, sorting A-Z is needed and for numbers sorting high to low.

Since this is a common use case, Gtk provides a straightforward way to enable this sorting using a type of `Expression` called a `PropertyExpression`. An `Expression` is a way to describe a reference to a value and a `Property Expression` does what it sounds like, it provides a property value in an `Expression`.

This is different than normal property bindings, because the object which is being bound doesn't have to exist when the expression is created. The expression is called `this`. It references an item, which has a property. The expression is getting the value of this property.

It is still possible to sort columns without expressions, but it is a lot of work!

Sorting without Expressions - Creating a Sorting Model

```
column_view = workbench.builder.get_object("column_view")
col1 = workbench.builder.get_object("col1")
col2 = workbench.builder.get_object("col2")
col3 = workbench.builder.get_object("col3")

model_func = lambda _item: None
tree_model = Gtk.TreeListModel.new(ta_model, False, True, model_func)
tree_sorter = Gtk.TreeListRowSorter.new(column_view.get_sorter())
sorter_model = Gtk.SortListModel(model=tree_model, sorter=tree_sorter)
selection = Gtk.SingleSelection.new(model=sorter_model)
column_view.set_model(model=selection)
```

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└─ The State of Python in GNOME

└─ Sorting without Expressions - Creating a Sorting Model

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tree_model = Gtk.TreeListModel.new(ta_model, False, True, model_func)
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selection = Gtk.SingleSelection.new(model=sorter_model)
column_view.set_model(model=selection)
```

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.

Sorting without Expressions - Creating Sorting Logic

```
def str_sorter(object_a, object_b, column):
    a = getattr(object_a, column).lower()
    b = getattr(object_b, column).lower()
    return (a > b) - (a < b)

def int_sorter(object_a, object_b, column):
    a = getattr(object_a, column)
    b = getattr(object_b, column)
    return (a > b) - (a < b)

col1.set_sorter(Gtk.CustomSorter.new(str_sorter, "title"))
col2.set_sorter(Gtk.CustomSorter.new(str_sorter, "author"))
col3.set_sorter(Gtk.CustomSorter.new(int_sorter, "year"))
```

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└─ The State of Python in GNOME

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def int_sorter(object_a, object_b, column):
    a = getattr(object_a, column)
    b = getattr(object_b, column)
    return (a > b) - (a < b)

col1.set_sorter(Gtk.CustomSorter.new(str_sorter, "title"))
col2.set_sorter(Gtk.CustomSorter.new(str_sorter, "author"))
col3.set_sorter(Gtk.CustomSorter.new(int_sorter, "year"))
```

Next we need to create our sorting logic. The first function we define is for sorting strings, like for the title and author columns. This function takes two objects and the column. It then gets both values using `getattr`, and sets them to lowercase so that the case of the string doesn't impact the sorting order.

Then it compares the first character of the string based on the unicode ordinal value of the character. If they are the same, then it compares the next character. If `a` is larger than `b`, the function returns 1, and if `b` is larger than `a` it returns -1. The integer sorting function works the same, except no lowercase is needed and the integers are directly compared.

Finally, we set the sorter of each column using Custom Sorters that we created. Wow, we did it, but that was a lot of work!

Sorting with Expressions

```
col1_exp = Gtk.PropertyExpression.new(Book, None, "title")
col2_exp = Gtk.PropertyExpression.new(Book, None, "author")
col3_exp = Gtk.PropertyExpression.new(Book, None, "year")

col1.sorter = Gtk.StringSorter.new(col1_exp)
col2.sorter = Gtk.StringSorter.new(col2_exp)
col3.sorter = Gtk.NumericSorter.new(col3_exp)
```

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└─ The State of Python in GNOME
└─ Sorting with Expressions

Sorting with Expressions

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col3.sorter = Gtk.NumericSorter.new(col3_exp)
```

The implementation of Fundamental Types in PyGObject fixes use case number 1 from the On PyGObject blog post. The original work to support this was started in 2010, and Arjan Molenaar brushed it off and brought it home.

Now we can make use of Expressions! Here we create three property expressions, pass in our Book class, None because we don't need to evaluate an extra Expression, and then the column name.

Finally we set the sorter for each column to String Sorters for the title and author columns and Numeric Sorters for the year column and pass in the Property Expressions we just created. Said another way the sorter for each column is bound to the property of the book for that column.

<https://pygobject.gnome.org>



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└─ The State of Python in GNOME

└─ <https://pygobject.gnome.org>

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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.

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Showing Up for Python in GNOME
└─ Packaging and Development Environment Improvements

Packaging and Development Environment Improvements

Packaging and Development Environment Improvements

Legacy Packaging

- 🐘 setup.py requires arbitrary code execution
- 🐘 pyproject.toml is a more explicit way to declare dependencies

The steps to build a Python project then can be separated:

1. Checkout the project
2. Install the build system
3. Execute the build

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Showing Up for Python in GNOME

└─ Packaging and Development Environment Improvements

└─ Legacy Packaging

Legacy Packaging

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- The steps to build a Python project then can be separated:
1. Checkout the project
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The Python project configuration in setup.py files was the standard for a very long time and is still widely adopted. When Python first developed its tooling for building projects, distutils was the answer. As time went on, setuptools gained popularity to add some features on top of distutils. Both used the concept of a setup.py file that project maintainers executed to build and install the software.

The downfall of this is there wasn't really a good way to declare what dependencies a project needs without running the setup.py file itself. The main Python install tool pip, was then executing arbitrary Python code just for pip to see the dependencies or to install a package.

An advantage of this was as a project maintainer, you could customize your build system in the setup.py directly. But, let's move to a more modern alternative where we can break up our build steps to install the build system and then execute the build.

meson-python

meson-python is a build backend for Python leveraging Meson

pyproject.toml

```
[tool.meson-python.args]
setup = ["-Dtests=false", "-Dwheel=true", "--wrap-mode=nofallback"]
[build-system]
build-backend = "mesonpy"
requires = ["meson-python>=0.12.1", "pycairo>=1.16"]
```

Build and Test

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

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Showing Up for Python in GNOME

└─Packaging and Development Environment Improvements

└─meson-python

meson-python

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build-backend = "mesonpy"
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Build and Test
$ meson setup _build
$ meson test -C _build
```

Meson is the standard build system used by GNOME projects, it is easy to use, powerful, and fast. meson-python implement the Python build system hooks, enabling Python build front-ends such as pip and build to build and install Python packages based on a Meson build definition. Since we are separating the steps any way when moving to pyproject.toml, we use meson-python to also build PyGObject. Other popular Python libraries like Numpy and Scipy have already moved to use meson-python, and pycairo (the python bindings for Cairo) will as well soon. It especially fills the niche of Python projects that need to compile other languages as well.

Here is a portion of the pyproject.toml looks like for the build settings. The parts in brackets are the section for meson-python arguments and the build system, and in each section are the key value pairs for setup options, the build backend, and build dependencies.

Nice so now we can build PyGObject like any other GNOME project.

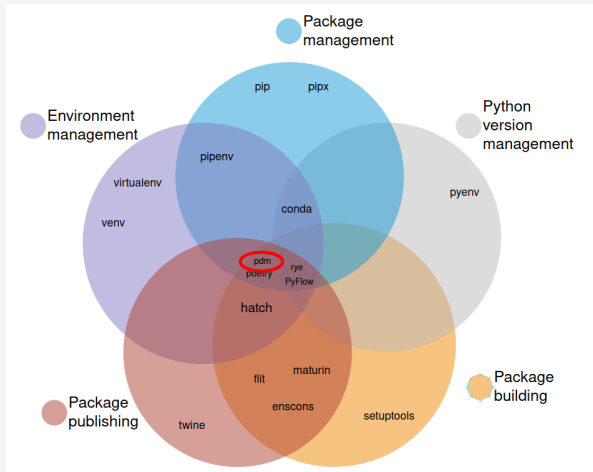


Figure 2: Packaging Categorization by Anna-Lena Popkes

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└ Packaging and Development Environment Improvements

└ PDM

PDM



Figure 2: Packaging Categorization by Anna-Lena Popkes

When someone says Python Packaging, they could mean a lot of different things.

- Environment management (which is mostly concerned with virtual environments) in purple
- Package management in blue
- Python version management in green
- Package building in yellow
- Package publishing in red

meson-python takes care of the yellow since it is a build tool. We decided to add PDM to the mix which takes care of a lot of the other areas to make it easier to contribute to the project and still works with meson-python. It manages dependencies installation including resolving and locking dependency versions, setting up a virtual environment, and publishing new versions of PyGObject to PyPI which is the Python Package Index.

One the other tools in the blue called pipx is really nice for installing isolated Python tools. As long as you have the other system dependencies installed for PyGObject, you can install PDM using pipx, grab the PyGObject source, and then run `pdm install` to get a complete working environment.

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
```

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Showing Up for Python in GNOME

└─ Packaging and Development Environment Improvements

└─ Modernize API Docs

Modernize API Docs

🔗 Modernize building docs using GI-DocGen and Sphinx

Template

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Methods

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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.

Main Branch

- 🐾 Small change to rename the primary branch to main
- 🐾 Improves exclusivity and standardization with other GNOME projects

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Showing Up for Python in GNOME

- └─ Packaging and Development Environment Improvements
- └─ Main Branch

Main Branch

✓ Small change to rename the primary branch to main

✓ Improves exclusivity and standardization with other GNOME projects

Overview of Async IO

- 🦋 Cooperative multitasking
- 🦋 Scheduled concurrently, but not actually run at the same time
- 🦋 Can provide large speedups if waiting on slower tasks

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Showing Up for Python in GNOME

└─ Packaging and Development Environment Improvements

└─ Overview of Async IO

Overview of Async IO

- 🦋 Cooperative multitasking
- 🦋 Scheduled concurrently, but not actually run at the same time
- 🦋 Can provide large speedups if waiting on slower tasks

Async IO is a means to use cooperative multitasking. It gives the feeling of concurrency despite using a single thread in a single process. The central feature of AsyncIO called Coroutines can be scheduled concurrently, but they don't actually run at the same time. This can provide large speedups for cases where the program is waiting on something slower than the main execution of the program itself. For example, if a program needs to go out and fetch information from the network or from a complex database query, it can schedule other things to happen while it is waiting for the data to return.

Async IO with my Kids



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Showing Up for Python in GNOME

- └ Packaging and Development Environment Improvements

- └ Async IO with my Kids

Async IO with my Kids



We have a Nintendo Switch at home and my kids like to play some Super Mario Kart 8 Deluxe or Super Smash Brothers with me. But, boy do they really take a long time to actually start playing. They will browse a couple videos about new game releases, they'll watch the game's opening credits, they will customize their character. Pretty soon, it is 15 min before we have even started to play something. There also really isn't an opportunity to interact much with them during this time period, so I'll often open my phone and see what's new on Mastodon, look at the latest chatter on Matrix, or take a look at anything new with the open source projects I'm working on. In this scenario, I am not doing full multitasking to do both things at the same time, I do other things while I wait for them to get ready. I didn't do more things at once, but I did do more things overall that I wanted to do.

This is kind of how Async IO works, it allows us to schedule tasks in coroutines, like playing a video game and looking at my phone, and switch between them when waiting for another.
`import asyncio`

Async IO in Python

```
import asyncio

async def hello():
    print('Hello ...')
    await asyncio.sleep(1)
    print('... World!')
async def main():
    await asyncio.gather(hello(), hello())
asyncio.run(main())
```

```
Hello ...
Hello ...
... World!
... World!
```

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Showing Up for Python in GNOME

└─Packaging and Development Environment Improvements

└─Async IO in Python

Async IO in Python

```
import asyncio

async def hello():
    print('Hello ...')
    await asyncio.sleep(1)
    print('... World!')
async def main():
    await asyncio.gather(hello(), hello())
asyncio.run(main())

Hello ...
Hello ...
... World!
... World!
```

This is a simple Hello World example of using Async IO. First we import it. Next we define a hello coroutine, which is a normal function definition with the async keyword in front. We print hello. Next we use the await keyword to let another coroutine run to sleep for 1 second. Finally after that runs we print World.

We also define a 2nd coroutine called main, this uses `asyncio.gather` to schedule the hello coroutine to be run twice concurrently as two tasks. When this executes, it print Hello, then runs sleep, but that is non-blocking so and there is another call of hello scheduled, so it prints Hello again. Once the sleep coroutine finishes, it resumes printing World twice.

Python Async with Gbulb

Gbulb uses the full GLib EventLoop

```
import asyncio, gbulb

gbulb.install(gtk=True)

loop = asyncio.get_event_loop()
loop.run_forever(application=my_gapplication_object)
```

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└─Python Async with Gbulb

Python Async with Gbulb

```
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import asyncio, gbulb
gbulb.install(gtk=True)

loop = asyncio.get_event_loop()
loop.run_forever(application=my_gapplication_object)
```

Here you can see that it was possible to import asyncio and gbulb, and tie asyncio to GLib EventLoop. This is useful for GUI applications because if you have something long running, you won't block the GUI and make it unresponsive. It was a heavy implementation that implements most asyncio functions on top of GLib. There was also another library called asyncio-glib that forced the GMainContext into the python SelectorEventLoop.

To compare them, Gbulb dispatches asyncio callbacks directly from the GLib main loop. In contrast, asyncio-glib iterates the GLib main loop until an asyncio event is ready and then has asyncio event loop dispatch the event.

Experimental: Async IO Integration

```
async def idle_test():
    bus = await Gio.bus_get(Gio.BusType.SYSTEM)
    print(
        await bus.call(
            "org.freedesktop.DBus",
            "/org/freedesktop/DBus",
            "org.freedesktop.DBus",
            "ListNames",
            None, None, 0, -1,
        )
    )
```

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Experimental: Async IO Integration

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            "ListNames",
            None, None, 0, -1,
        )
    )
```

After 2 years of work, Benjamin Berg finished an initial implementation of Asyncio integration with PyGObject which was merged this week! So now we have Python asyncio await for Gio async results. This approach uses the GMainLoop to drive the EventLoop, by forcing a modified SelectorEventLoop/ProactorEventLoop into GMainLoop/GMainContext. One large advantage this has it allows us to await Gio async functions.

Let's walk through an example listing the names that are available on the DBus. DBus allows inner process communication to allow applications to talk to each other. After doing some imports (which I didn't show here), we define a coroutine called idle test. Since Gio support asynchronous calls we await getting the SystemBus by calling `Gio.bus_get` and passing in the bus type. Now that we have the system bus, we call call the DBus while passing in the bus name, object path, interface name, and the method we want to use, then there is parameters for the method (None), a reply type (None), extra flag, and the -1 gives us the default timeout.

Experimental: Async IO Integration

```
policy = GLibEventLoopPolicy()
asyncio.set_event_loop_policy(policy)
loop = policy.get_event_loop()
loop.run_until_complete(idle_test())

(['org.freedesktop.DBus', 'org.freedesktop.Notifications',
 ':1.129', ':1.108', 'org.freedesktop.portal.Desktop',
 'org.freedesktop.background.Monitor', ':1.9',
 'org.gnome.Mutter.DisplayConfig', 'org.freedesktop.systemd1',
 'org.gnome.Mutter.IdleMonitor', ...
])
```

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└─Packaging and Development Environment Improvements

└─Experimental: Async IO Integration

Experimental: Async IO Integration

```
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asyncio.set_event_loop_policy(policy)
loop = policy.get_event_loop()
loop.run_until_complete(idle_test())

(['org.freedesktop.DBus', 'org.freedesktop.Notifications',
 ':1.129', ':1.108', 'org.freedesktop.portal.Desktop',
 'org.freedesktop.background.Monitor', ':1.9',
 'org.gnome.Mutter.DisplayConfig', 'org.freedesktop.systemd1',
 'org.gnome.Mutter.IdleMonitor', ...
])
```

Finally we need a bit of boilerplate to get things going. We get the `GLibEventLoopPolicy` which is used to get or set event loops. We then set the policy with `asyncio` which wires up the `GMainLoop` to drive the Eventloop. We then get the event loop and tell the program to run the idle test coroutine until it is complete!

Our program then prints out the names from `DBus` and we have successfully awaited an async results.

The Future

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└─ The Future

The Future

Wheels for Windows

- 🐍 Python 3.8+ no longer loads DLLs on the path
- 🐍 Building GTK using MSVC with `pip install pygobject` doesn't work for getting started
- 🐍 Solution: build wheels of PyGObject with the DLLs included

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└─ Wheels for Windows

Wheels for Windows

🐍 Python 3.8+ no longer loads DLLs on the path
🐍 Building GTK using MSVC with `pip install pygobject` doesn't work for getting started
🐍 Solution: build wheels of PyGObject with the DLLs included

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

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└─ Port to libgirepository-2.0

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

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>
- 🐾 This would finish centralizing all docs

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- └─ Move API Docs

Move API Docs

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- ✓ This would finish centralizing all docs

Our New Story

PyGObject is a great choice for building apps in GNOME.

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PyGObject is a great choice for building apps in GNOME.

Call to Action

<https://gitlab.gnome.org/GNOME/pygobject>

- 🐾 Contributions of any kind will help continue to help the community thrive
- 🐾 Submit and help triage issues
- 🐾 Continue to help us improve the docs
- 🐾 Help us fix bugs and implement features
- 🐾 Add examples to Workbench
- 🐾 Build projects with PyGObject
- 🐾 Chat with us at [#python:gnome.org](#)

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└─ Call to Action

Many of you have even more ideas on what we could improve next, and we would love to have your contributions!

[Call to Action](#)

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Wrap Up

Thanks!

Thank you so much to everyone who has contributed to PyGObject, and special thanks to Christoph Reiter and Arjan Molenaar who help maintain it.

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Slides

<https://github.com/danyeaw/presentations/tree/main/showing-up-for-python-in-gnome>

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└─ Wrap Up

Wrap Up

Thanks!

Thank you so much to everyone who has contributed to PyGObject, and special thanks to Christoph Reiter and Arjan Molenaar who help maintain it.

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Questions?

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Questions?