Quansight

Quansight Labs

Quansight's take on Python packaging & WheelNext

WheelNext Summit

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What we're building & supporting

Quansight Labs: mission is to support the PyData ecosystem

20+ maintainers of CPython, NumPy, SciPy, scikit-learn, pandas, Polars, PyO3, Numba, Jupyter, IPython, packaging tools, the array API standard, and more

Quansight Consulting: consulting in and around the PyData stack

- Many applied AI/ML projects
- Nebari - our OSS data science platform, reproducible environment management & collaboration, runs on Kubernetes
- High-performance Python engineering: collaborate with Meta on PyTorch, with Red Hat on RHEL AI, with Google on JAX

Current challenges

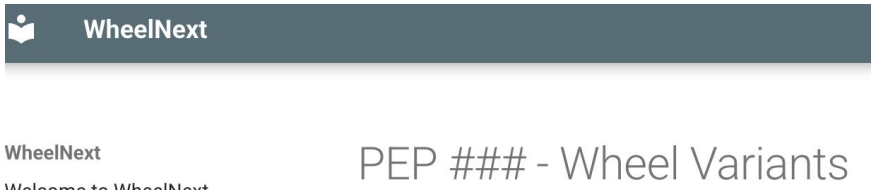
Common challenges:

1. OSS projects using outdated or bad practices packaging-wise. Particularly true for deep learning projects!
2. Managing CUDA environments with wheels requires too much manual effort

For NumPy, SciPy and scikit-learn:

1. Packaging BLAS, OpenMP and compiler runtimes for PyPI remains painful and fragile
2. Using SIMD is too hard - only NumPy does it, via dynamic dispatch which is labor-intensive.

What we're looking ahead to adopt



Wheel variants

Wheel variant support promises to solve multiple usability issues.

And for package authors, unlocks performance & may avoid contentious decisions (e.g., when do we drop support for pre-AVX2 CPUs?).

PEP 739 – `build-details.json` 1.0 — a static description file for Python build details

Solid cross compilation support

We may finally get good cross compilation support, building on PEP 739 (accepted).

This matters to a lot of distro maintainers, and it lowers the maintenance burden for new/niche CPU architectures.

“Works well” top 3

1. Package managers - uv and pixi are a huge step up
2. Better build backends for native code - meson-python and scikit-build-core
3. The Python packaging community got friendlier & more collaborative over time

“Needs work” top 3

1. Accelerator support in Python packaging
2. Binary size issues - CUDA, ROCm and deep learning libraries in particular should pay much more attention to keeping binary sizes under control.
3. Support for distros too often is only an afterthought

WheelNext - planned contributions

- Wheel variants - we identified UX design, a build backend prototype, and performance scaling as concrete items to contribute to
- Reviewing PEPs and designs for other proposals that build variants
- WheelNext community building/engagement
- Updating pypackaging-native as needed

Why WheelNext matters

It’s the first initiative with this level of
ambition to solve these real-world problems and
developer effort & buy-in to match.

We're excited!