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What are we building?

JAX is a Python library for accelerator-oriented array computation and program transformation.

We have multiple components and ecosystem projects distributed as python wheels:

- jax: pure python library
- jaxlib: C/++ parts of the library
- JAX PJRT plugins: C/++ device-specific implementations

In addition, there are many libraries built on top of JAX for specific use cases, e.g. deep learning. These are usually pure Python libraries.

Top 3 that work well

1. Distributing C++ libs as Python wheels
    - Could be easier
    - But great for user ease-of-use and dependency pinning
    - e.g. cuda wheels virtually eliminated JAX:GPU installation problems

2. Basic install very easy
    - e.g. pip install jax[cuda]

3. uv is awesome
    - Really fast
    - Has flag to help test minimum dependencies
    - Can still use pip API

Current challenges related to packaging wheels

- No great way to describe accelerators
  - JAX supports many hardware platforms: CUDA, ROCM, TPU, ...
  - Currently use "extra" deps (e.g. pip install jax[cuda])
  - Even more complicated with specific accelerators
    - e.g. Blackwell requires CUDA 12.8, but other GPUs are less restrictive. JAX has no way to encode this conditional requirement, just uses less restrictive dependency.

- Visibility and ease-of-use of extra deps
  - pip "forgets" you installed extras, so e.g. upgrading flax can implicitly upgrade jax without upgrading platform-specific deps
  - Would like consistency of installed extras

- Needing to add a dependency upper bound post-release
  - Currently need to re-release, but older versions are still broken

Current challenges related to PyPI and indexes

- Package size limitations
  - jaxlib and PJRT plugins are large and quickly run into PyPI limitations

- Poor index experience outside of PyPI
  - Nightlies are released on an index outside of PyPI, requires user supplying index url

Contributing to WheelNext

- Provide active feedback and feature requests
- Provide early testing of new systems

Current items we are looking to improve

- JAX stack ai for easy install of a full working stack
- Single python index for JAX 3P stack nightlies and old versions
- Better minimum version testing across dependencies