

Ophyd Async

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Ophyd Async

- Presented at NOBUGS 2022 as Ophyd v2
- Now a parallel library
- Trialing at:
 - Diamond Light Source
 - NSLS-II
 - BESSY
 - DESY



Ophyd Async

- Asynchronous hardware abstraction layer for Bluesky
- Parity with pymalcolm and ophyd
- (Mostly) harmonious coexistence with ophyd devices
- <https://blueskyproject.io/ophyd-async/main/explanations/design-goals.html>



Diamond-II Programme

- Storage ring upgrade: 2027-29
- Flagship beamline programme: 2028-2030:
 - K04: MX Ultra-High Throughput
 - SWIFT: Spectroscopy High Throughput
 - CSXID: Multi-modal imaging
- Software modernisation programme: 2022-2030

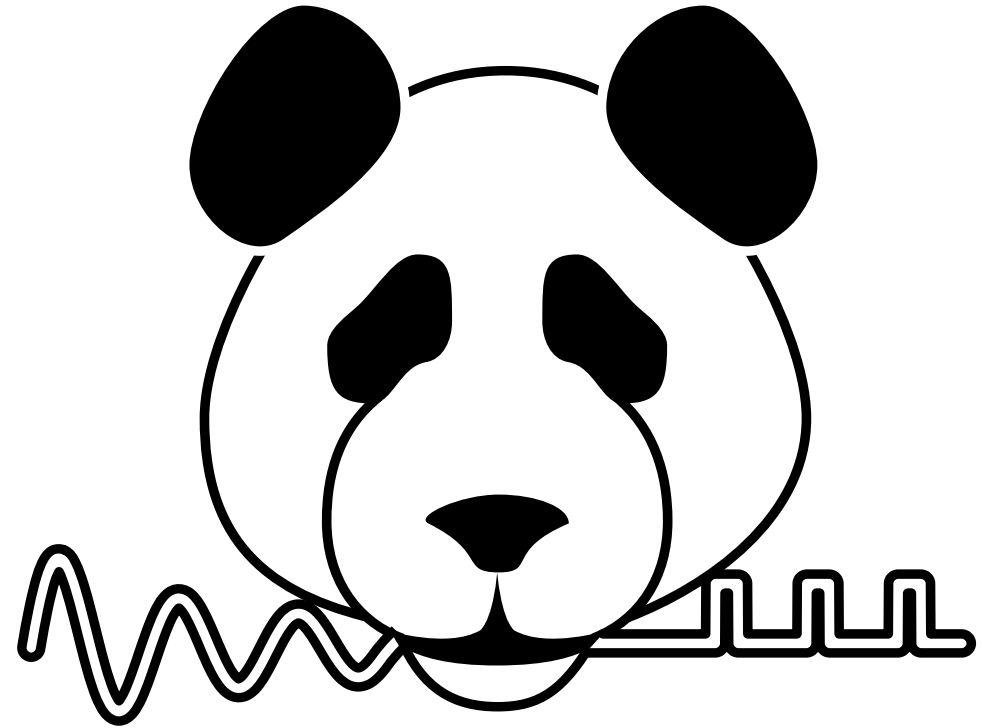


Design

- Core API is lightweight, flexible and sans-IO
- Easy to implement hardware abstraction for multiple control systems
- Out of box support for EPICS (PVA and CA) and soon Tango
- Uses async/await primitives instead of multithreading
 - Performance improvement over malcolm and ophyd
 - Easier to maintain/blessed python route to concurrency

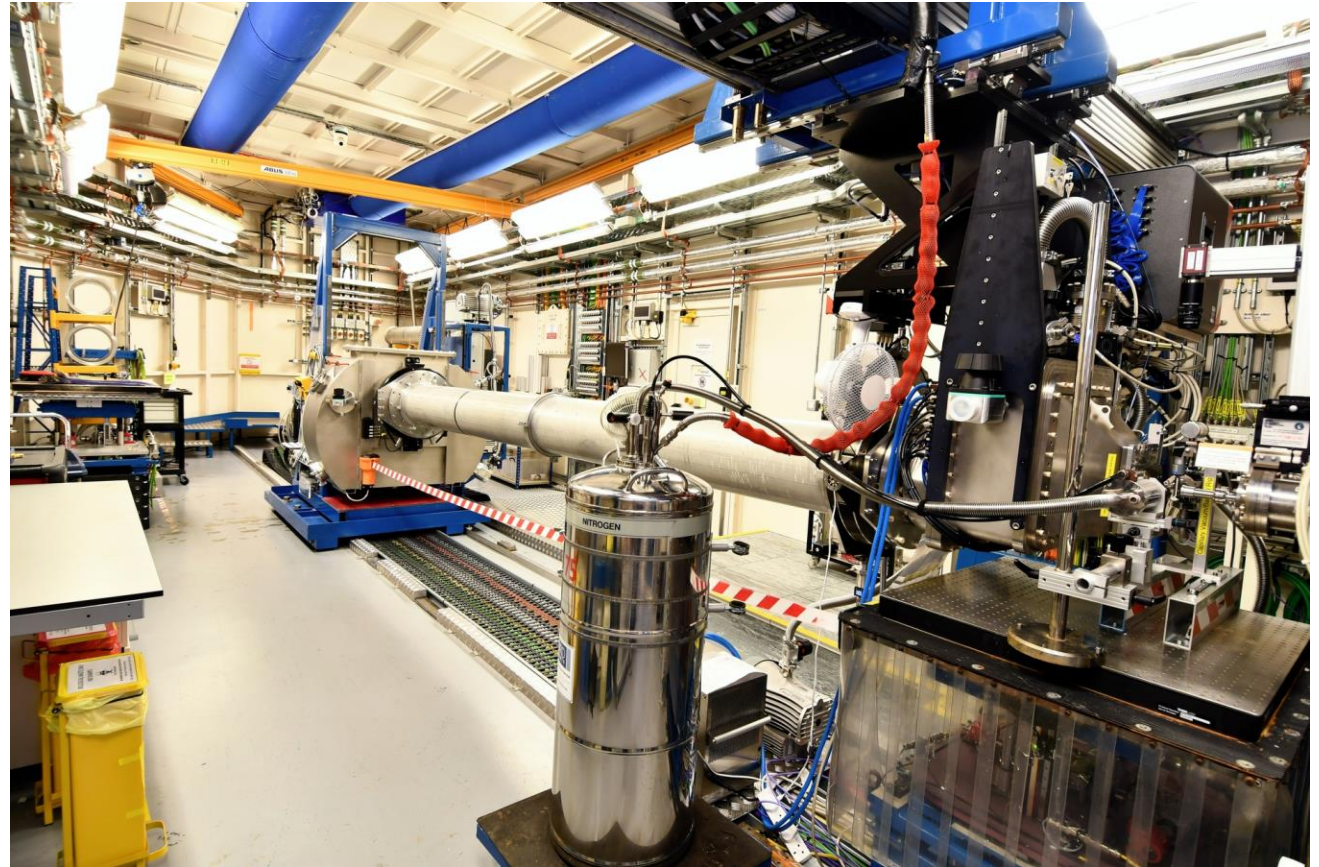
Fly scanning

- Primary use case
- Compositional approach for simplified maintainability
- Out of box support for
 - PandA
 - AreaDetector core plus common detectors
 - Pmac trajectory scanning (soon)
- Opinionated but not prohibitive

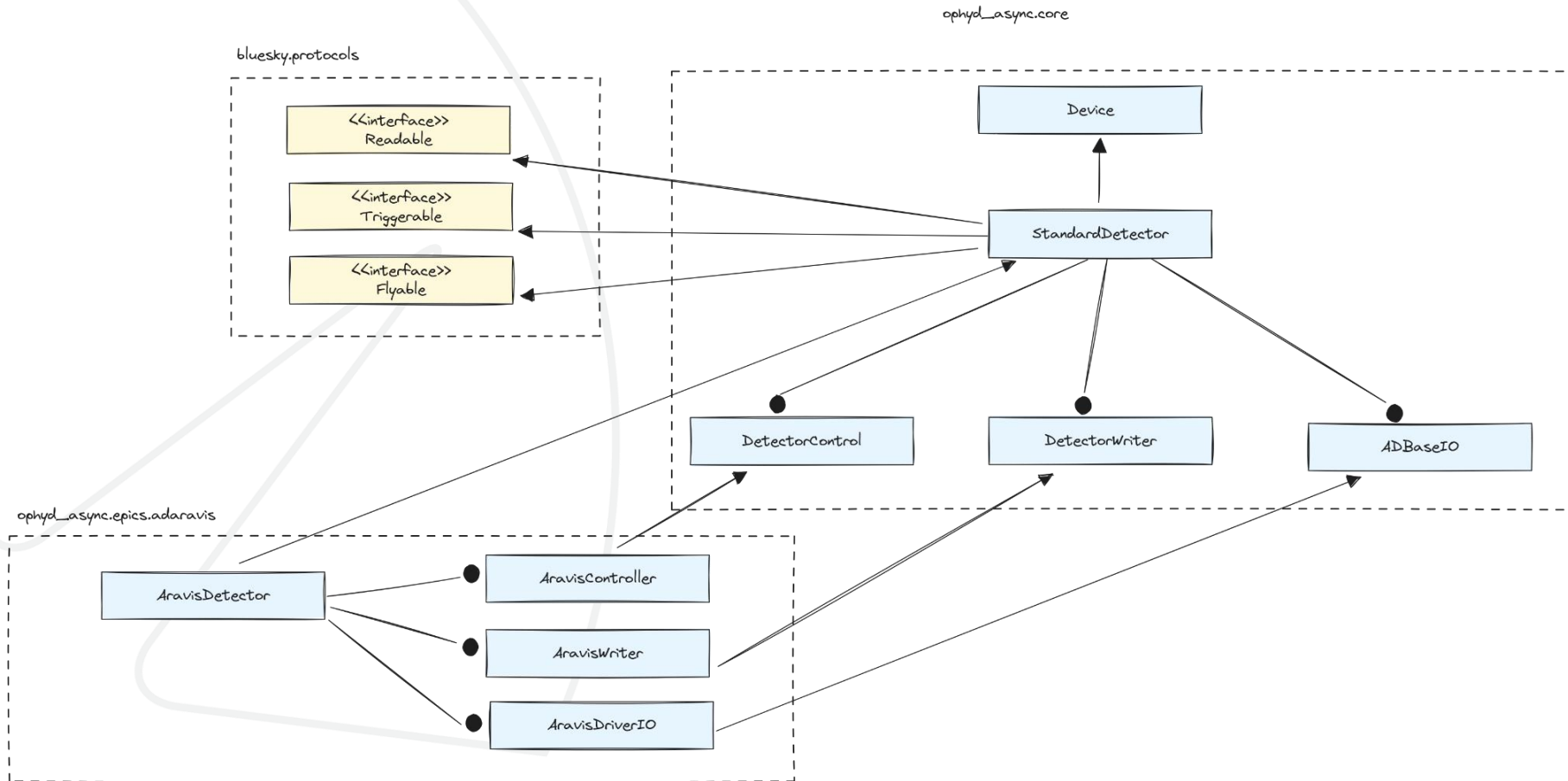


PandA for TFG

- Installed on I22 beamline, TFG EOL
- Malcolm not flexible enough
- Three types of time resolved experiment
 - Linkam (tested Nov. 2023)
 - Stop flow (tested Jun. 2024)
 - Pressure jump (testing scheduled Mar. 2025)



Core API

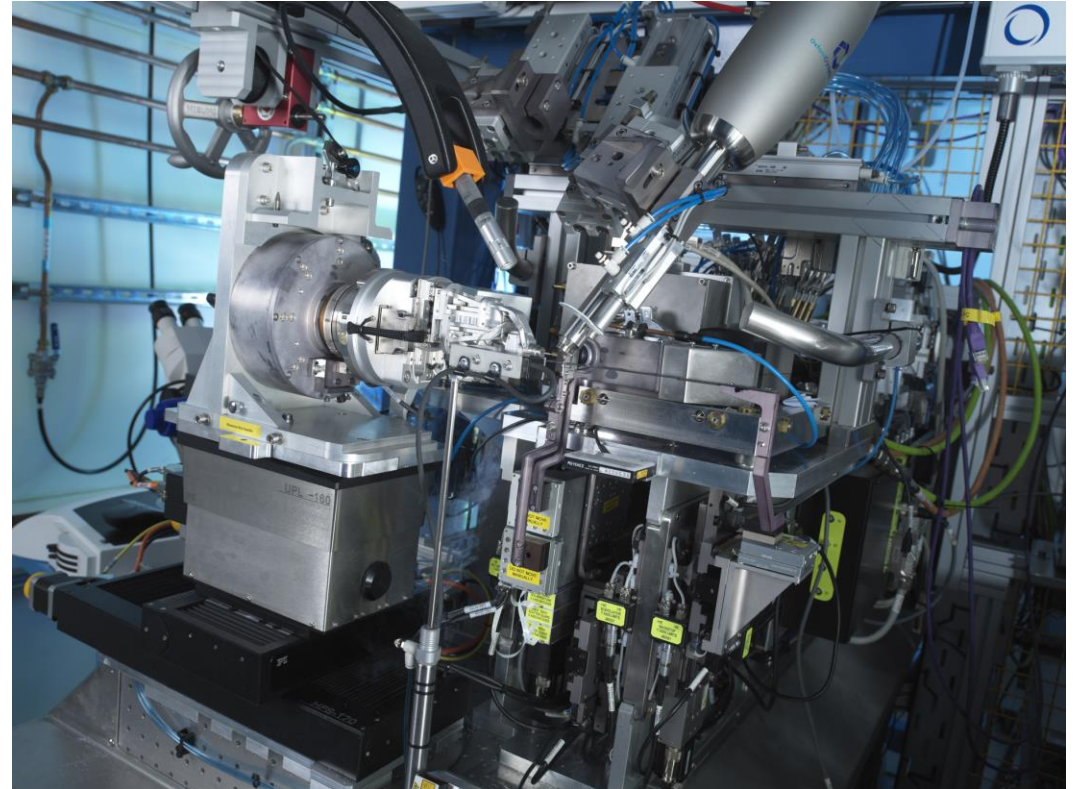


Load/Save

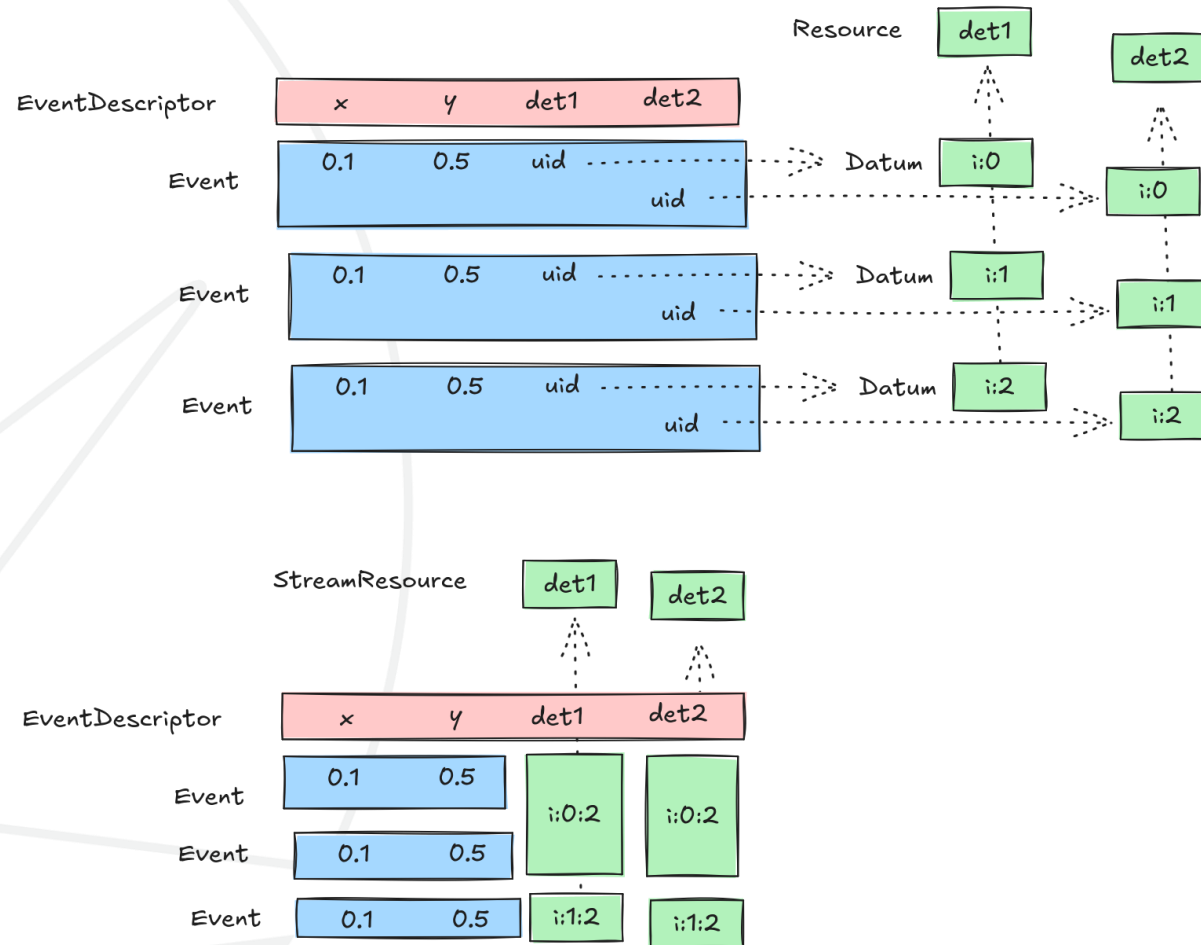
- Fewer errors when starting from a known state
- Sometimes the state and the experimental variable are one and the same
- Not trivial to detect this, but we have a best-effort solution

Unattended Data Collection

- K04 beamline starts operations in 2030 targeting 10,000 samples per day
- Focus on performance and complex orchestration
- Currently in the realm of 1000 samples per day



Support in Document Model



Community

- Regularly discussed on weekly dev call
- <https://github.com/bluesky/ophyd-async/issues>



Road Map

- Close to 1.0.0 (targeting late 2024/early 2025)
- Generalising to support Tango
- Trajectory scanning
- Documentation and training materials
- <https://github.com/bluesky/ophyd-async/milestone/3>

Useful Links

- <https://blueskyproject.io/ophyd-async>
- <https://diamondlightsource.github.io/dodal>
- <http://blueskyproject.io/bluesky-cookbook/glossary/flyscanning.html>

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