

# AUTOMATED CI/CD WITH GITHUB ACTIONS

## *STARTING FROM SCRATCH – A WALKTHROUGH*

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University  
of Glasgow

VIA VERITAS VITA



# What is CI/CD?

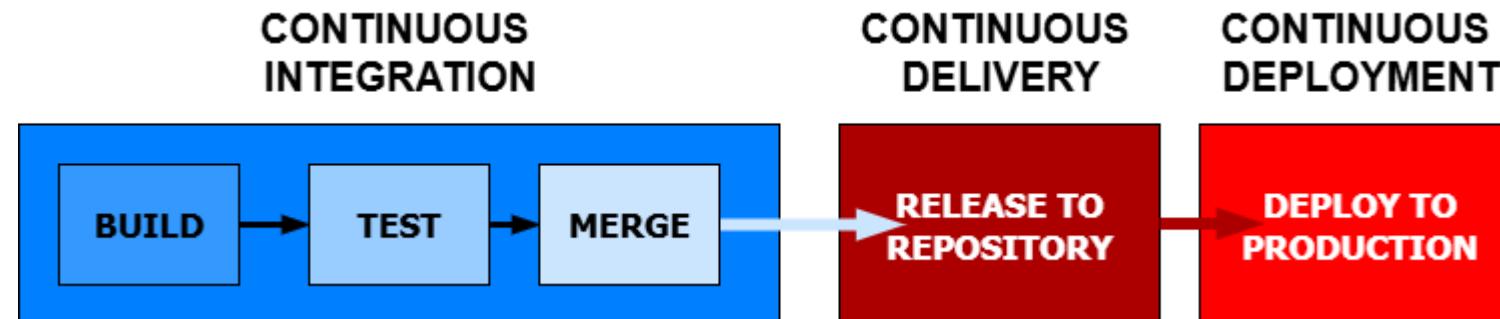
*Automating boring, repeatable tasks that ensure code is robust and reusable*

## Continuous Integration

- Usually triggered when code is updated in PR or main
- Running pre-defined tests
- Pass / Fail - Checking that change doesn't break anything

## Continuous Delivery / Deployment

- Often triggered when code is merged into main, or tagged for release
- CI workflow passed -> containerise and deploy to server / hub

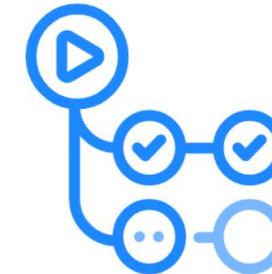
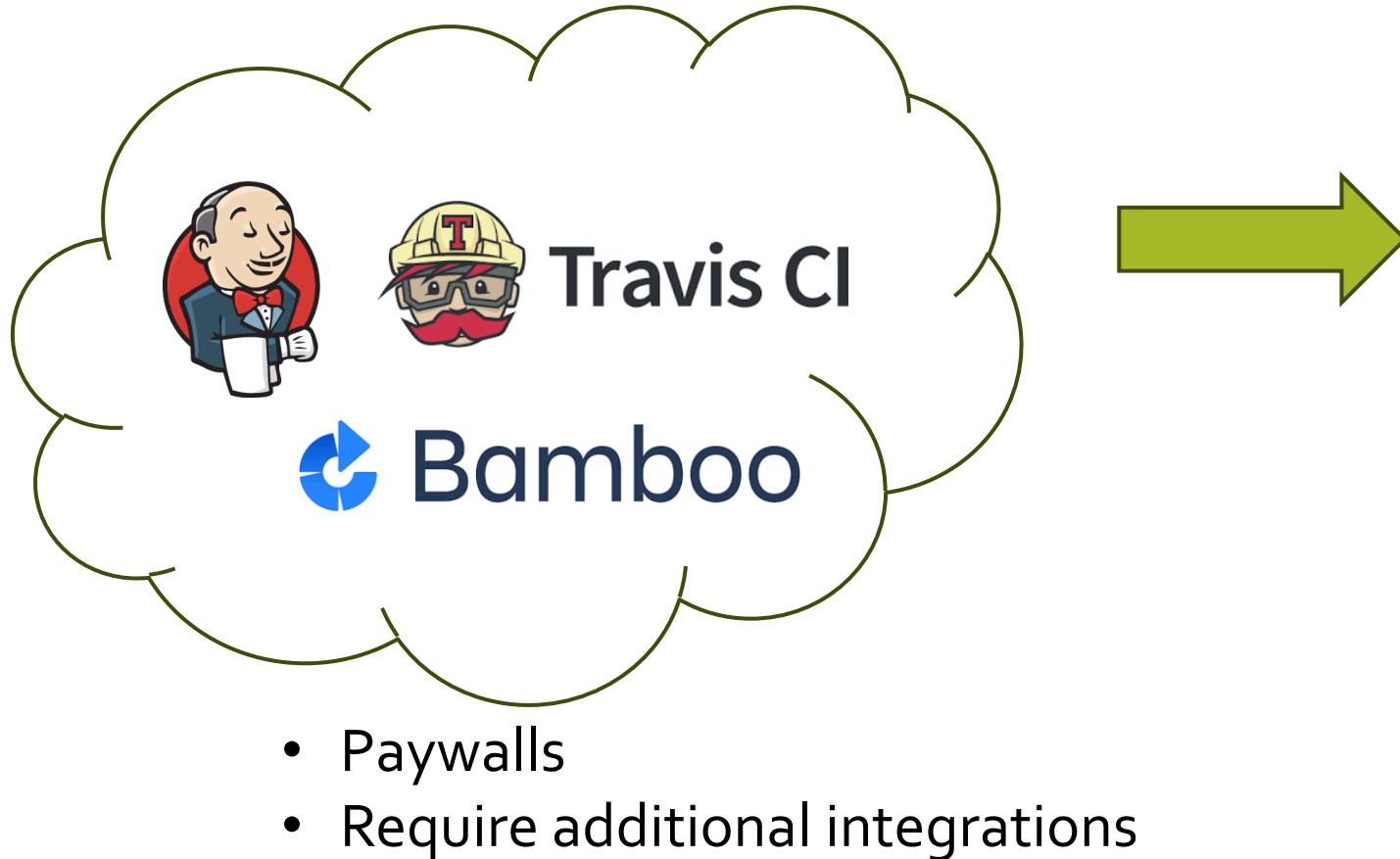


# Why use CI/CD?

- Runners are containerised – a fresh environment to verify everything installs / runs
- Can ensure code works on a variety of operating systems and versions
  - E.g. Python 3.8 <-> 3.13
  - Windows, Linux, MacOS
- Manually repeating processes can be tedious / forgotten about (-> bugs slipping in)
- Fully customisable triggers
- Makes your software **FAIR**

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**IT WORKS**  
on my machine

# Why use GitHub Actions?



## GitHub Actions

- Simple
- Ubiquitous
- “Free” to use
- Code is already there



\* Other options are available

# Is it right for your software?

- Not just for big companies
- Templated YAML workflows for common use cases
- Reusable actions from the Marketplace to plug-and-play
- Start simple; build in complexity only when you need it
  - Focus on automating tests as an initial win
  - CD (deployments / semantic versioning) more relevant when production-ready.



The screenshot shows the GitHub Marketplace interface. At the top, there's a search bar with the placeholder "Type to search" and a search icon. Below the search bar, a banner says "Enhance your workflow with extensions" and "Tools from the community and partners to simplify tasks and automate processes". A search bar below the banner has the text "type:actions category:deployment python". To the right of the search bar is a decorative graphic featuring a purple 3D cube with glowing nodes and lines around it, set against a blue and green abstract background.

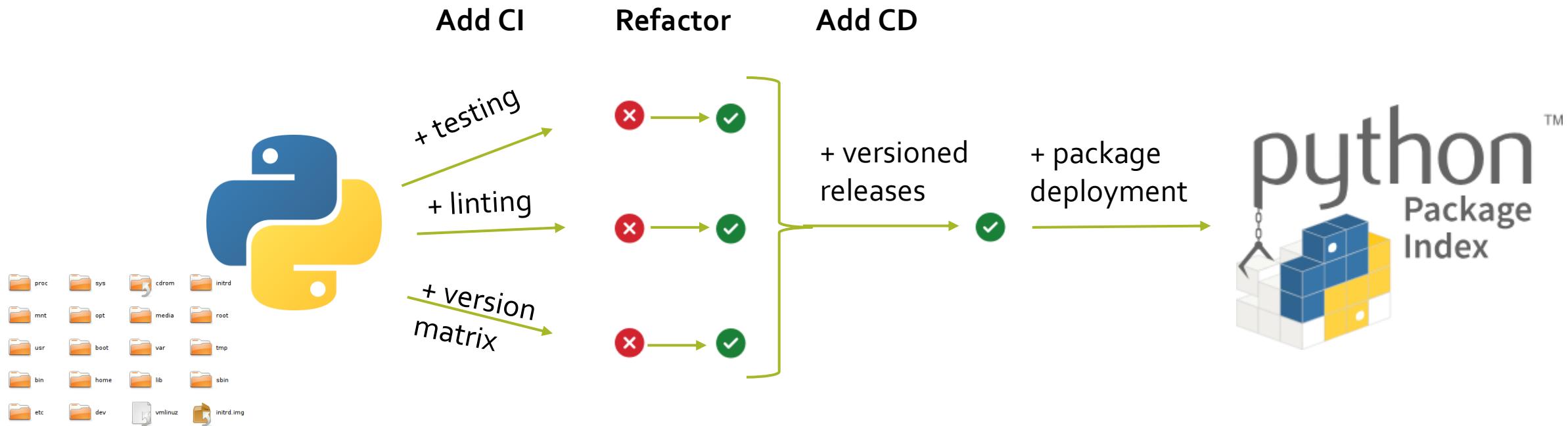
On the left, there's a sidebar with navigation links: "Featured", "Copilot", "Models", "Apps", "Actions" (which is currently selected), "AI Assisted", "API management", "Backup Utilities", and "Chat".

The main area is titled "Search results for 'python'" and shows "83 results". It includes filters for "All", "By All creators", and "Sort: Popularity". There are four visible action cards:

- pypi-publish** (Action): Upload Python distribution packages to PyPI.
- Build executables or extension modules...** (Action): Build a module or standalone executable from python code using Nuitka on Mac/Linux/Windows. Very wide range of compatibility.
- PyInstaller Windows** (Action): Customisable GitHub Action to package your python code with PyInstaller for Windows.
- Python wheels manylinux build** (Action): Build manylinux wheels for a (Cython) Python package.

# Structure of Walkthrough

- Template repo – simple installable Python package with tests
- Will use GitHub Codespaces -> VSCode in the browser
- Will “live code” incremental steps / contrived examples to demonstrate value / common gotchas



# Walkthrough: Link to repository template



<https://github.com/haessar/rsecon25-gha-walkthrough>