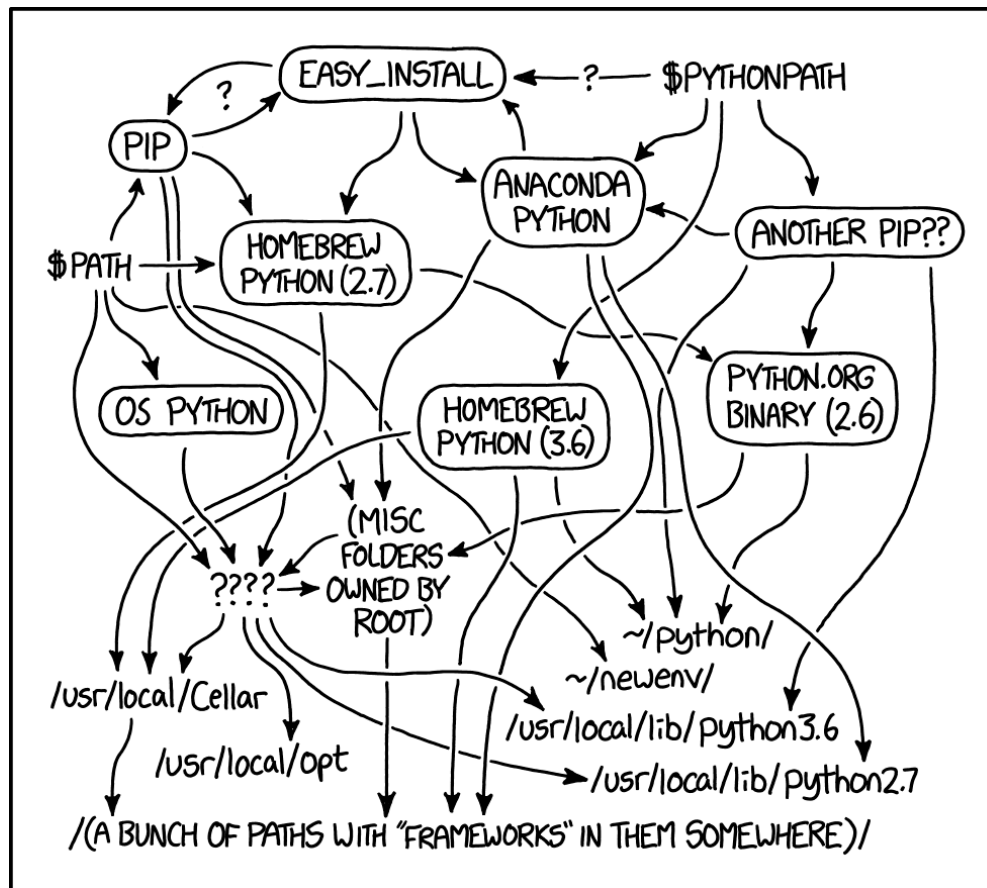


BEYOND LANGUAGE SILOS

Purely functional package management with Guix

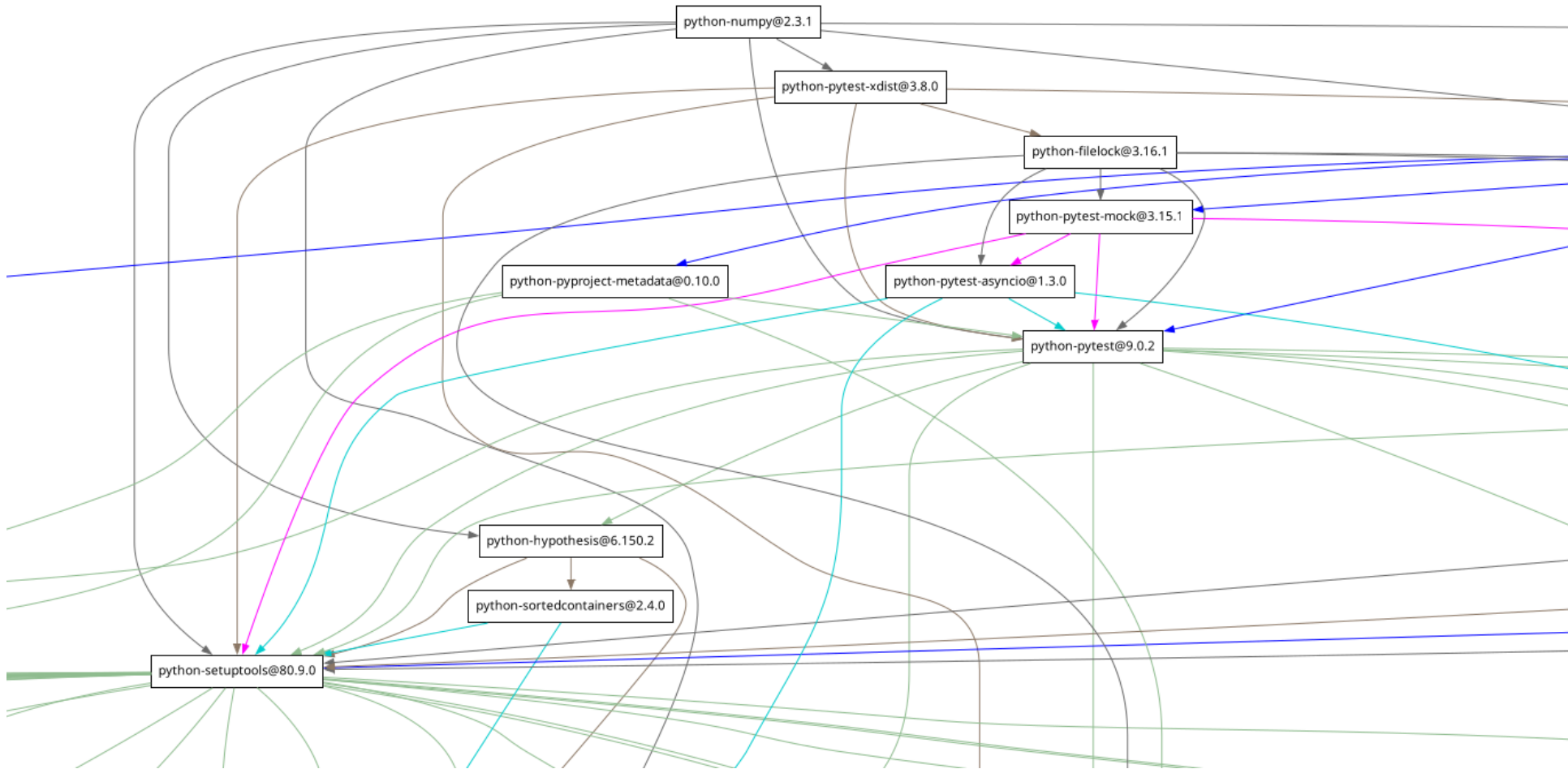
Arun Isaac (University College London)

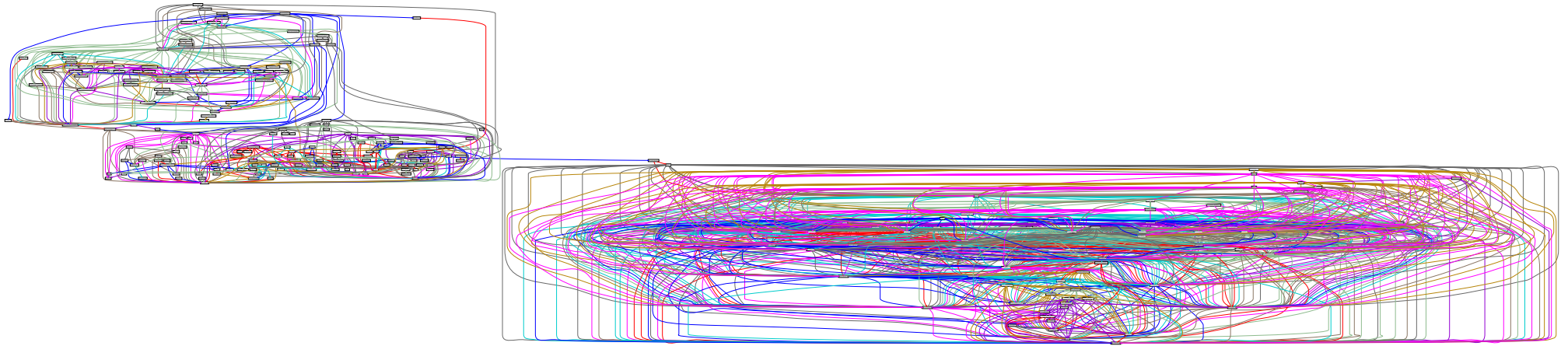
STEP-UP RSLondon 2026 (June 29, 2026)



MY PYTHON ENVIRONMENT HAS BECOME SO DEGRADED
THAT MY LAPTOP HAS BEEN DECLARED A SUPERFUND SITE.

```
$ wget -qO /tmp/pytorch.zip https://files.pythonhosted.org/.../torch-2.12.1-  
cp314-cp314-manylinux_2_28_x86_64.whl  
$ unzip -l /tmp/pytorch.zip | grep '\.so'  
    25185   06-12-2026 18:56   torch/_C.cpython-314-x86_64-linux-gnu.so  
  1565241   06-12-2026 18:56   torch/lib/libc10.so  
   606153   06-12-2026 18:56   torch/lib/libc10_cuda.so  
   22737   06-12-2026 18:56   torch/lib/libcaffe2_nvrtc.so  
  254009   06-12-2026 18:56   torch/lib/libgomp.so.1  
   57057   06-12-2026 18:56   torch/lib/libshm.so  
   89177   06-12-2026 18:56   torch/lib/libtorch.so  
446770065   06-12-2026 18:56   torch/lib/libtorch_cpu.so  
462345233   06-12-2026 18:56   torch/lib/libtorch_cuda.so  
  43936745   06-12-2026 18:56   torch/lib/libtorch_cuda_linalg.so  
   17017   06-12-2026 18:56   torch/lib/libtorch_global_deps.so  
  4003481   06-12-2026 18:56   torch/lib/libtorch_nvshmem.so  
32795561   06-12-2026 18:56   torch/lib/libtorch_python.so
```





GUIX: PURELY FUNCTIONAL PACKAGE MANAGEMENT

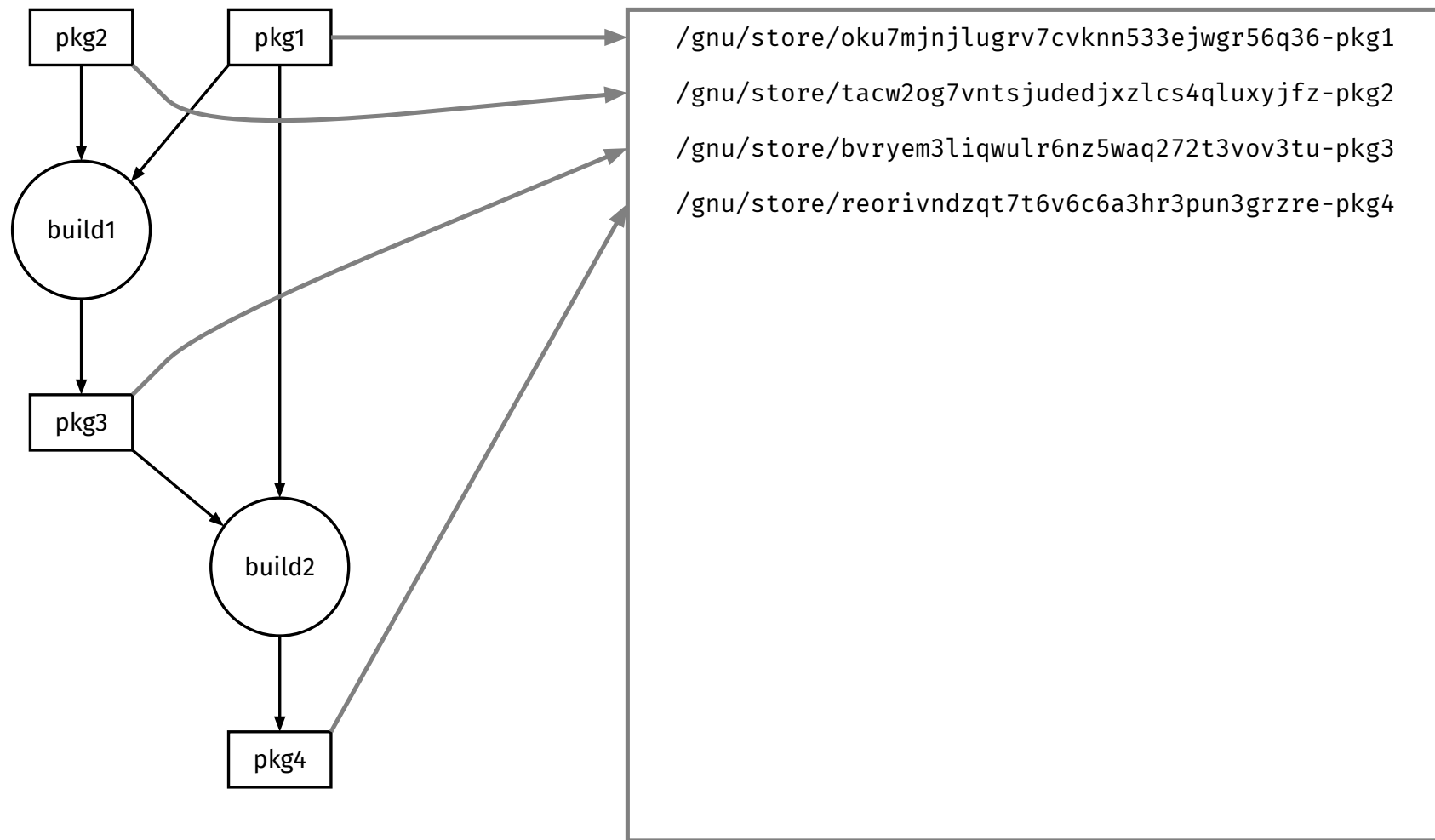
```
$ ls /gnu/store
17c9lc7qdi08dgngwfgwpa36vlb52b9g-acl-2.3.1
1j2diyw5nkk104mlg0filq5w8pkgmyl9-libcap-2.64
49m5357rhckpn7nvvpfhfv579i3hzipq8w-bash-5.2.37
8pagb69089r3vaqvvrqs1kabs4zr72z3-readline-8.2.13
98rxpjki5i0ri1n3w7nwf1j4x9qxl2xl-bash-static-5.2.37
b75qs4fcf1m080dkx5l23jki26hnck1h-attr-2.5.1
bmyld857bf6z790fgkmw4dazdfrxs6lz-glibc-2.41
dsgx6g0vxmf8i7rbwf8mad7y6k60yba0-emacs-subdirs
fizaq3d8nwzc2kpwdhvx8yhrah1lsf7i-gmp-6.3.0
j785qzw0319kr2fz0gkfk3g0giz9idpr-coreutils-9.1
n8gbhdhw3aa2c1bhq425is68chrz53cc-gcc-14.3.0-lib
py66h07z1mm1a8gyfq1jryqmpyib0p8k-profile
zhd6vry080npschxc0nkacwjkiaknig7-ncurses-6.2.20210619
zlj3gapy2sp9f8fz9wflhk24pg6hiwfw-info-dir
```

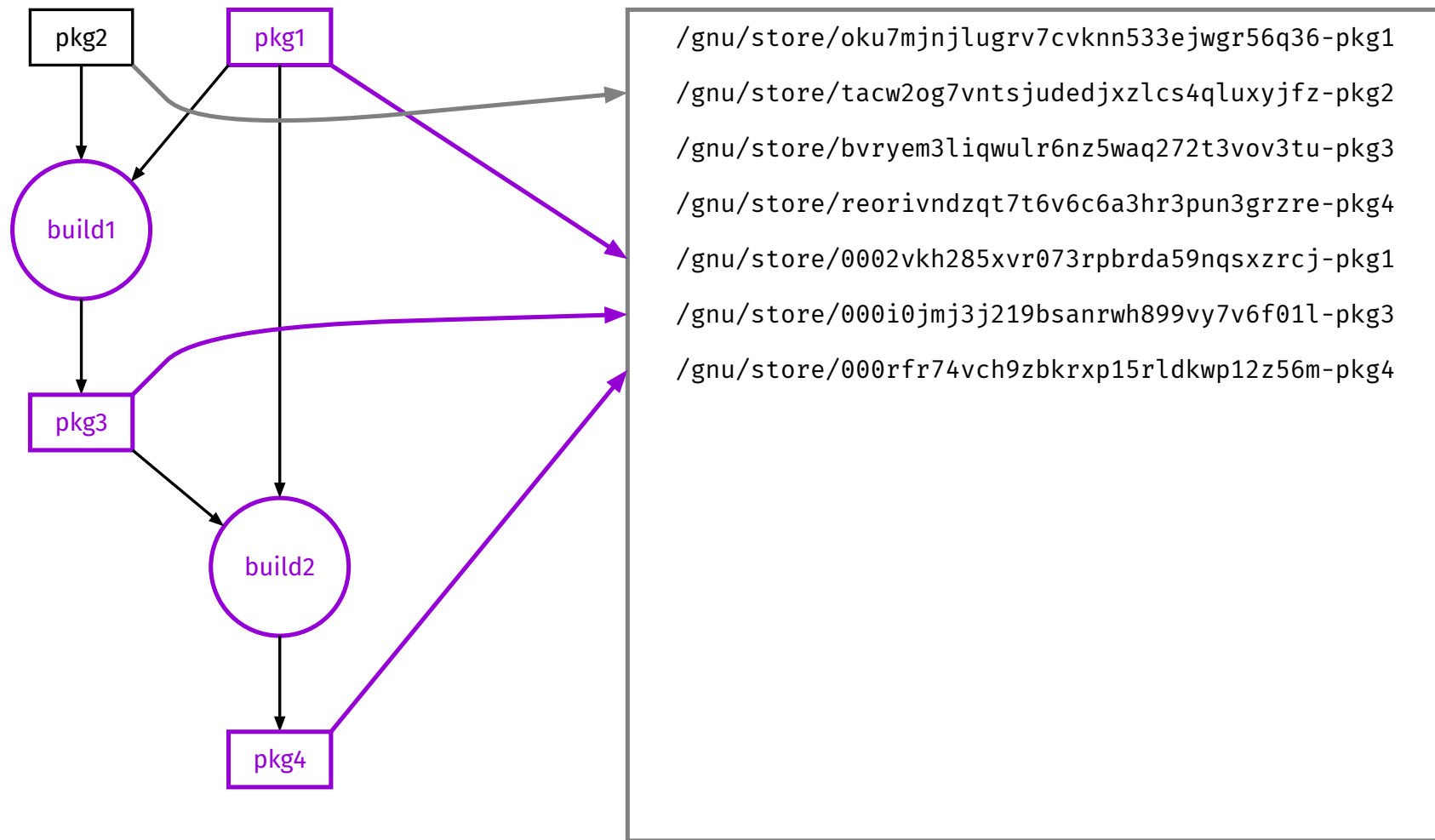
```
$ guix build hello
```

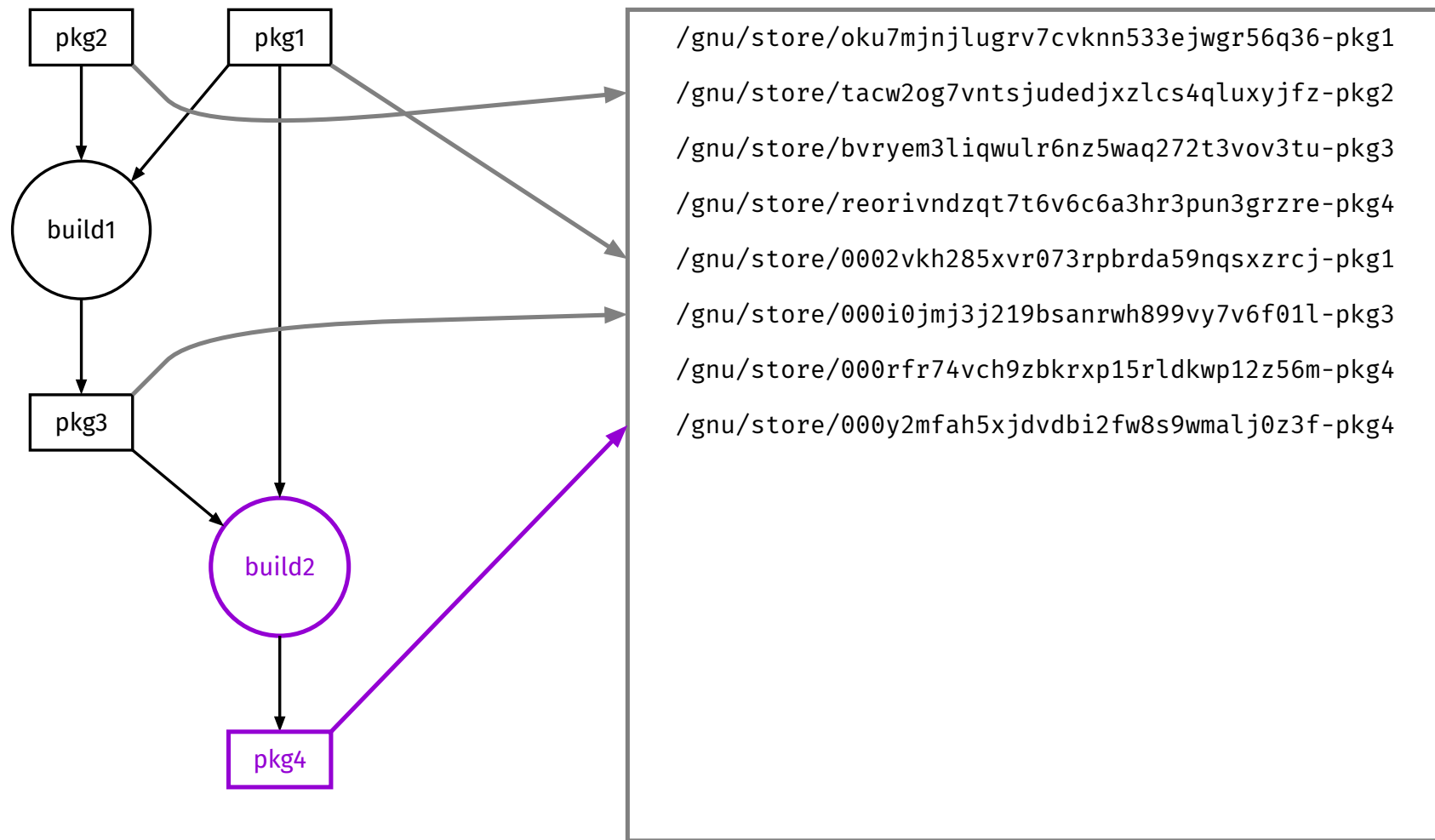
```
/gnu/store/82qgmjgihvhvr7g79h7vcdqzr52b5a5n-hello-2.12.3
```

```
$ tree /gnu/store/82qgmjgihvhvr7g79h7vcdqzr52b5a5n-hello-2.12.3
```

```
├── bin
│   └── hello
└── share
    ├── info
    │   └── hello.info.gz
    └── man
        └── man1
            └── hello.1.zst
```







- **memoization** for binary substitutes
- **rootless** package installation
- that means easy verification of builds aka **supply chain security**
- true **reproducibility**
- first class **local packages**—upstream packages are not special—no blessing required from distro maintainers
- **virtual environments** in every language via `guix shell`
- easy creation of **Docker/Singularity images** on the command-line via `guix pack`
- rollbacks

- E-mail: arun.isaac@ucl.ac.uk
- Guix website: <https://guix.gnu.org/>
- *What's in a package?* Guix blog post: <https://hpc.guix.info/blog/2021/09/whats-in-a-package/>