Preparing a 30 year-long project with Nix and NixOS

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Who am I?

Figure 1: Minijackson
1. Context
A particle accelerator

A particle accelerator generating neutrons.

Composed of lots of hardware, like:

- Power supplies
- Magnets
- Beam diagnostics
- Cryogenics
- Plasma chamber
- ...
A need of control

Figure 2: Old logo
Packaging the control

Figure 3: EPNix Logo
A need of isolation

Network as isolated as possible
A need of resilience

Lots of assumptions to rethink.

We could have to modify a project 10 years after development.
2. Nix and NixOS and resilience
Development resilience

With flake-style development, projects are pinned.

It should be easy to pick them up again years after deployment.
Source code resilience

Some software might not be available in the future.
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Solution:

- CI
- cache server
- cache *everything*
  - runtime dependencies
  - build-time dependencies (*everything*)
  - flake inputs
  - Nix itself (done by default for NixOS)
Figure 4: Cache continuous integration
Profiles

Usage of nix profiles to have a deletion policy.

We can differentiate between old versions and new versions of garbage collection roots.

1  system-583-link → /nix/store/ ...
2  system-584-link → /nix/store/ ...
3  system-585-link → /nix/store/ ...
4  system-586-link → /nix/store/ ...
5  system-587-link → /nix/store/ ...
Conclusion

I have high hopes that Nix can be useful for building reliable and resilient systems.

Building some parts of a resilient infrastructure are still manual and need documentation.
Links

- https://github.com/epics-extensions/EPNix/
- https://github.com/NixOS/bundlers (the toBuildDerivation bundler)