

Nix

Antoine R. Dumont (@ardumont)

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1 purely functional package manager

2 Expectations

3 Pros

4 Cons

5 Nix sample

6 Install

7 Remove

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Enforces functional approach to package management

- 1 Declarative
Let the machines work or complain!
- 2 Lazy
Only compute and install what you ask for!
- 3 Pure
Idempotency!

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Same as other package managers:

- install programs/libraries (with a *unified* DSL)
- integrated in a distribution: NixOS
- home-manager: Reproduce your home!

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- ***Unified* DSL**
- **Multi-user** support
- **Source/binary** model (binary cache, build-farm, hydra, etc...)
- **Upgrades/rollback** environment
- **No versioning clash** in dependencies between programs/libraries
- **Reproducibility**
- **Documented** (mostly centralized today)
- **Community** (open discussion on tracker/irc, open PR, etc...)
- **Tools:** nix repl, nix search, nix-build, nix-shell, nix-collect-garbage,
...

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- **Steep** learning curve, quite some new notions (nix-channel, derivation, overlays. . .)
- **Disk Space** (\rightarrow *nix-collect-garbage*)
- Inconsistency in between environments or within (haskell, python, etc. . .)
- Not unified tool interface (nix build vs nix-build? . . .)

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1 Program

```
{ stdenv, fetchurl }:
```

```
stdenv.mkDerivation rec {  
  name = "hello-${version}";  
  version = "2.10";  
  src = fetchurl {  
    url = "mirror://gnu/hello/${name}.tar.gz";  
    sha256 =  
      "0ssi1wpaf7plaswqqjwigppsg5fyh99vdlb9kzl7c9lng89ndq1i"  
  };  
  doCheck = true;  
  meta = with stdenv.lib; {  
    description = "Produces a familiar friendly greeting";  
    homepage = https://www.gnu.org/software/hello/manual/;  
    license = licenses.gpl3Plus;  
    maintainers = [ maintainers.eelco ];  
    platforms = platforms.all;  
  };  
}
```

2 Service

```
{ config, lib, pkgs, ... }:  
  
with lib;  
let cfg = config.services.xserver.windowManager.fluxbox; in  
  options = {  
    services.xserver.windowManager.fluxbox.enable =  
      mkEnableOption "fluxbox";  
  };  
  config = mkIf cfg.enable {  
    services.xserver.windowManager.session = singleton {  
      name = "fluxbox";  
      start = ''  
        ${pkgs.fluxbox}/bin/startfluxbox &  
        waitPID=$!  
      '';  
    };  
    environment.systemPackages = [ pkgs.fluxbox ];  
  };  
}
```


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1 Imperative

```
$ hello
```

The program 'hello' is currently not installed. It is provided by several packages. You can install it by typing one of the following:

```
nix-env -iA nixos.hello
```

```
nix-env -iA nixos.mbedtls
```

```
nix-env -iA nixos.perkeep
```

```
$ nix-env -i hello
```

```
warning: there are multiple derivations named 'hello-2.10';  
installing 'hello-2.10'
```

```
these paths will be fetched (0.04 MiB download, 0.19 MiB unpacked):
```

```
/nix/store/gdh8165b7rg4y53v64chjys7mbbw89f9-hello-2.10
```

```
copying path '/nix/store/gdh8165b7rg4y53v64chjys7mbbw89f9-hello-2.10'  
from 'https://cache.nixos.org'...
```

```
building '/nix/store/39c7sm1sn97yd783jyw50bdabq69gfjm-user-environment'  
created 1656 symlinks in user environment
```

```
$ hello
```

```
Hello, world!
```


2 Declarative For a bare nix, the declarative part is not so clear.

1 nix (with home-manager)

```
...  
home.packages = [  
  pkgs.hello  
];
```

Then:

```
home-manager switch
```

2 nixos

```
...  
environment.systemPackages = [  
  pkgs.hello  
];
```

Then:

```
sudo nixos-rebuild switch
```

Note: All users have now access to that program

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❶ Imperative Remove explicitly from user environment:

```
$ nix-env -e hello
```

```
uninstalling 'hello-2.10'
```

```
$ hello
```

```
The program 'hello' is currently not installed. It is provided by:
```

```
...
```

❷ Declarative Rollback to previous generation

```
$ nix-env --rollback
```

```
switching from generation 91 to 90
```

```
$ hello
```

```
The program 'hello' is currently not installed. It is provided by:
```

```
...
```