

A gentle introduction to Nix

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Why do we Nix?!

Why ~~do we~~ I Nix?!











nixos-rebuild --rollback switch





Intermezzo: Functional Programming

<https://serokell.io/blog/introduction-to-functional-programming>

<https://www.tweag.io/blog/2022-11-08-functional-programming-from-sets-and-functions/>

<https://learn.microsoft.com/en-us/archive/msdn-magazine/2009/october/functional-programming-for-everyday-net-development>

<https://learn.microsoft.com/en-us/dotnet/fsharp/tutorials/functional-programming-concepts>

<https://www.manning.com/books/get-programming-with-haskell>

<https://parentheticallyspeaking.org/articles/how-not-to-teach-recursion/>





Side effects and pure functions

r

```
myList = [1,2,3]  
myList.reverse()  
newList = myList.reverse()
```

What is newList equal to?

```
myList = [1,2,3]  
myList.reverse()  
newList = myList.reverse()
```

Ruby



```
myList = [1,2,3]
myList.reverse()
newList = myList.reverse()

> [3,2,1]
```


JavaScript



```
myList = [1,2,3]  
myList.reverse()  
newList = myList.reverse()  
  
> [1,2,3]
```

Python



```
myList = [1,2,3]  
myList.reverse()  
newList = myList.reverse()
```

```
> None
```

First-class functions

```
fn sayHi() {  
    return "Hi, ";  
}
```

```
fn greet(hiFn, s) {  
    print(hiFn() + s);  
}
```

```
greet(sayHi, "Config Management Camp!");
```

```
> Hi, Config Management Camp!
```

Immutability



```
myList = [1,2,3]  
myList.reverse()  
newList = myList.reverse()
```

```
myList = [1,2,3]  
myList.reverse()  
newList = myList.reverse()
```

```
myList = [1,2,3]  
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```
myList = [1,2,3]  
myList = myList.reverse()  
newList = myList.reverse()
```

```
myList = [1,2,3]  
newList = myList.reverse()
```


Recursion



```
fn recursiveFun(a) {  
    if a <= 0  
        return 0;  
    return a + recursiveFun(a-1);  
}
```

```
recursiveFun(5);
```

```
> 15
```

```
fn recursiveFun(a) {  
    if a <= 0  
        return 0;  
    return a + recursiveFun(a-1);  
}
```

```
recursiveFun(5);
```

```
> 15
```

```
fn recursiveFun(a) {  
    if a <= 0  
        return 0;  
    return a + recursiveFun(a-1);  
}
```

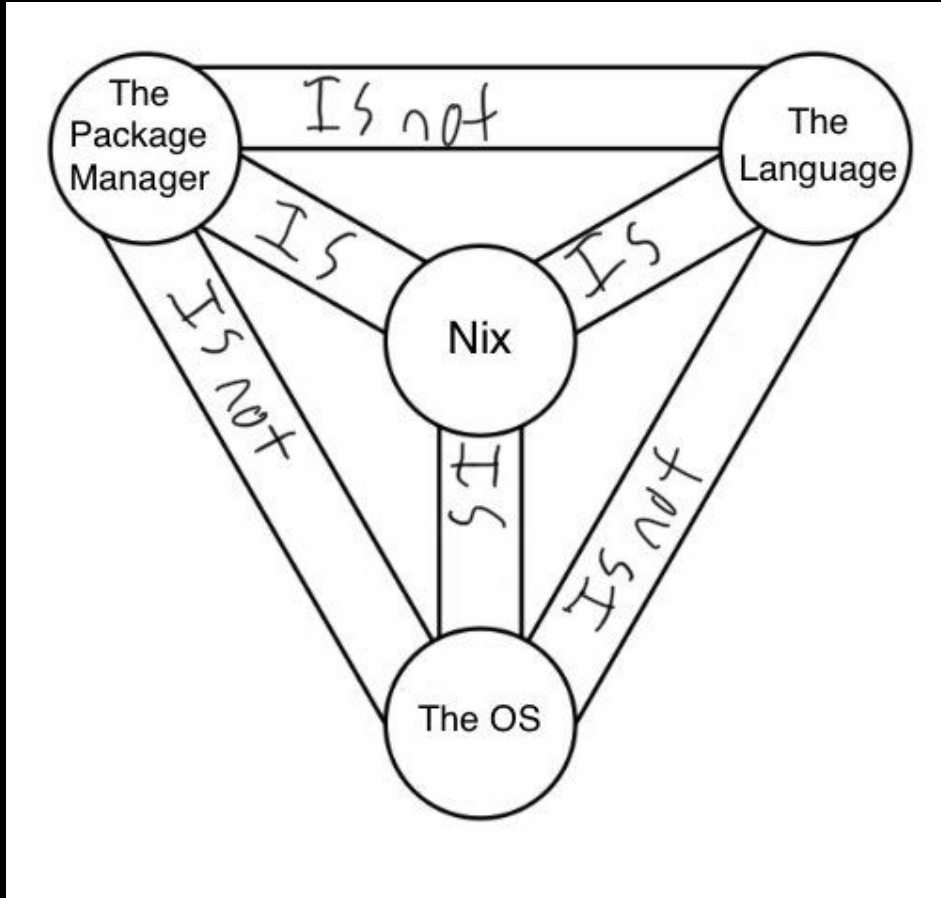
```
recursiveFun(5);
```

```
> 15
```

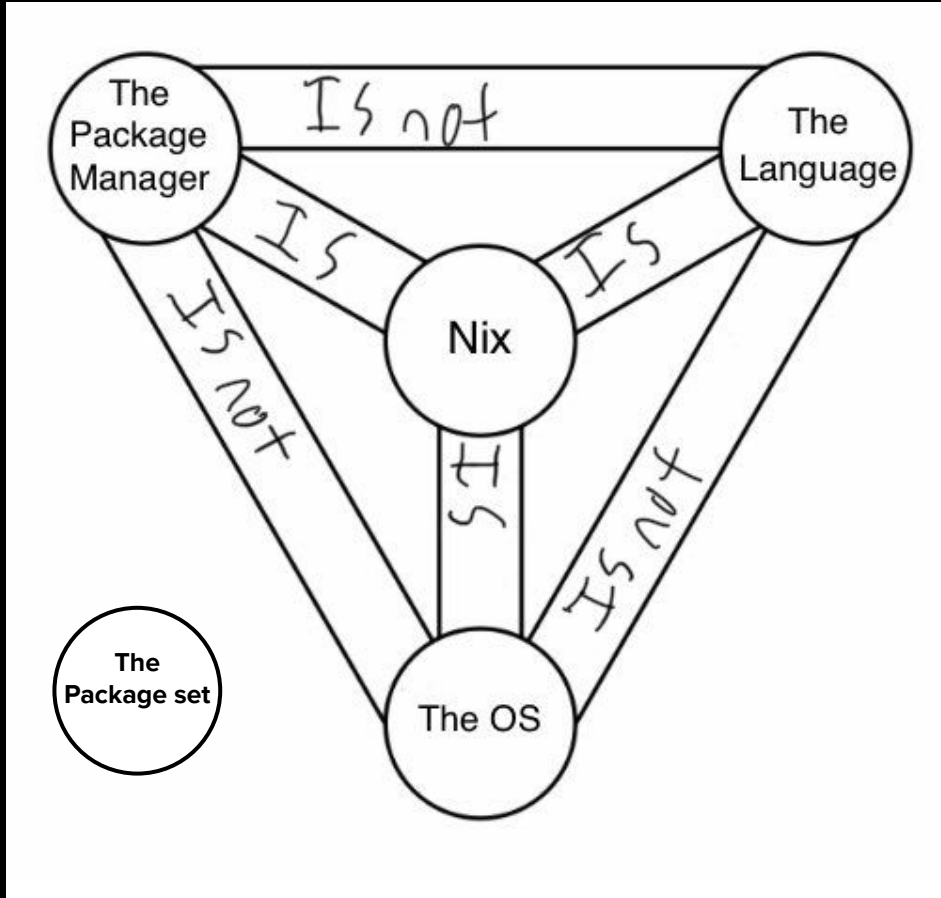
What is Nix?

What is Nix?

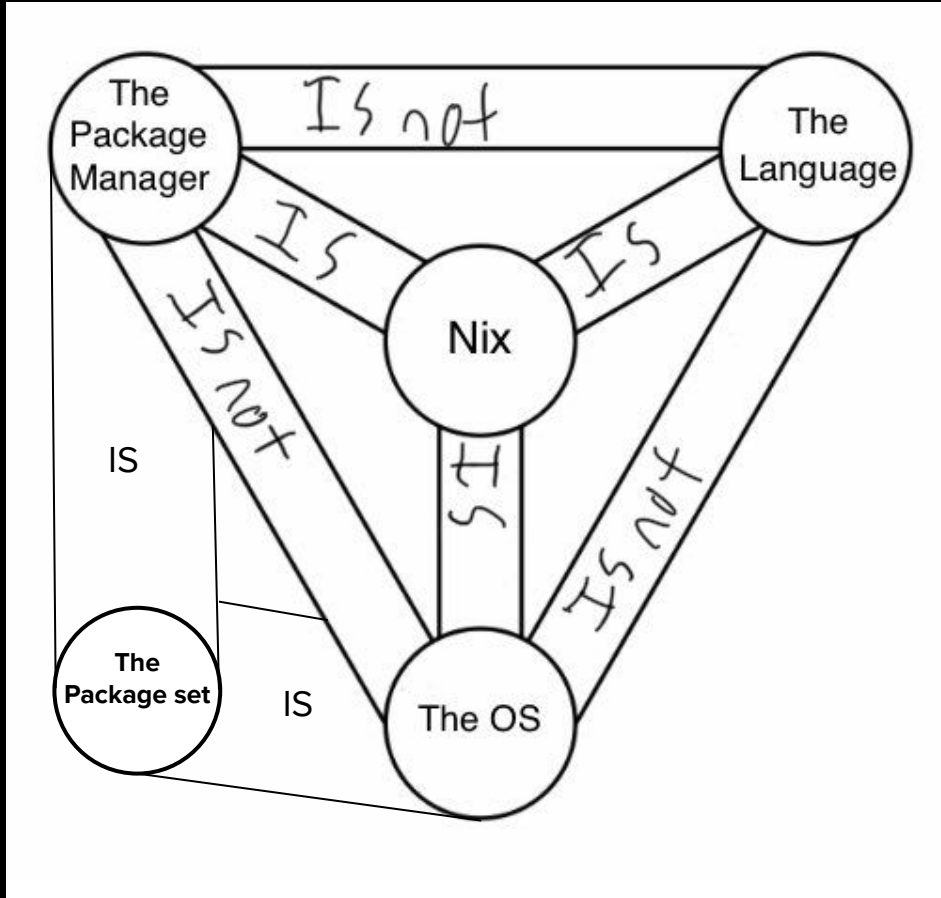
It's complicated...



<https://twitter.com/theprincessxena/status/1360214709790728192?s=20&t=F5A1283qndkuq4uU1aRE6Q>



<https://twitter.com/theprincessxena/status/1360214709790728192?s=20&t=F5A1283qndkuq4uU1aRE6Q>
+ some horrible edits by myself





<https://github.com/NixOS/nixos-artwork/blob/master/logo/nix-snowflake.svg>

Nix, the package manager

<https://edolstra.github.io/pubs/phd-thesis.pdf>

<https://nixos.org/manual/nix/stable/>

<https://nixos.org/manual/nixpkgs/stable/>

<https://nixos.org/manual/nix/stable/installation/multi-user.html>

<https://github.com/vim/vim>

Not too different



```
$ sudo apt install emacs
```

```
$ nix profile install nixpkgs#emacs
```

Not too different



```
$ sudo apt install emacs
```

```
$ nix profile install nixpkgs#emacs
```

But it can do some tricks



```
$ vim
```

```
vim: command not found
```

```
$ nix shell nixpkgs#vim
```

```
...
```

```
$ vim --version
```

```
VIM - Vi IMproved 9.0 (2022 Jun 28, compiled Jan 01 1980 00:00:00)
```



```
$ nix run nixpkgs#vim -- --version  
VIM - Vi IMproved 9.0 (2022 Jun 28, compiled Jan 01 1980 00:00:00)  
...
```



```
$ nix develop nixpkgs#vim
```

```
...
```

```
$ unpackPhase && cd source
```

```
...
```

```
$ vim
```

```
vim: command not found
```

```
$ make && make test
```

```
...
```

```
$ ./src/vim --version
```

```
VIM - Vi IMproved 9.0 (2022 Jun 28, compiled Jan 01 1980 00:00:00)
```

```
Included patches: 1-609
```

```
Compiled by bryan@X1
```

```
...
```



```
$ nix store gc  
... store paths deleted, ... MiB freed
```


Nix, the language

<https://nixos.org/manual/nix/stable/language/index.html>
<https://nix.dev/tutorials/nix-language>

Nix, the programming language

<https://nixos.org/manual/nix/stable/language/index.html>
<https://nix.dev/tutorials/nix-language>

```
fun = { pkgs, myList }:  
pkgs.lib.reverseList myList  
...  
fun { pkgs = pkgs;  
      myList = [ 1 2 3 ]; }  
> [ 3 2 1 ]
```

```
{ lib, fetchFromGitHub }:  
rec {  
  version = "9.0.0609";  
  
  src = fetchFromGitHub {  
    owner = "vim";  
    repo = "vim";  
    rev = "v${version}";  
    hash = "sha256-...=";  
  };  
};
```

...

```
...  
    hardeningDisable = [ "fortify" ];  
    postPatch =  
        ''  
        ...  
        '' ;  
}
```

Nix, the OS

<https://nixos.org/manual/nixos/stable/>

<https://www.tweag.io/blog/2022-10-11-stable-narhashes/>

<https://xeiaso.net/talks/nixos-pain-2021-11-10>

<https://blog.wesleyac.com/posts/the-curse-of-nixos>

<https://ops.functionalalgebra.com/nixos-by-example/>

```
users.users.bryan = {  
    isNormalUser = true;  
    home = "/home/bryan";  
    description = "Bryan Honof";  
    extraGroups = [ "wheel" "networkmanager" ];  
    openssh.authorizedKeys.keys = [ "..." ];  
};
```

```
services.prometheus.exporters.node = {  
    enable = true;  
    port = 9100;  
    enabledCollectors = [ "logind" "systemd" ];  
    disabledCollectors = [ "textfile" ];  
    openFirewall = true;  
};
```




Nix, the package set


<https://github.com/NixOS/nixpkgs>
<https://nixos.org/manual/nixpkgs/stable/>

master231 branches113 tagsGo to fileCode

wegank Merge pull request #214748 from r-ryantm/auto-update/pa... 3ceb1d7 2 minutes ago 451,897 commits

.github	CODEOWNERS: add new Rust team members, re-add Rust build sup...	last week
doc	Merge pull request #214763 from lheckemann/doc-requirefile	15 hours ago
lib	Merge pull request #205557 from ncfavier/concatLines	5 days ago
maintainers	Merge pull request #214870 from SharzyL/circt	2 hours ago
nixos	podman: 4.3.1 -> 4.4.0	4 minutes ago
pkgs	Merge pull request #214748 from r-ryantm/auto-update/partclone	2 minutes ago
.editorconfig	.editorconfig: disallow trailing whitespace for markdown again	last month
.git-blame-ignore-revs	git-blame-ignore-revs: fix commit hash	5 months ago
.gitattributes	sapling: simplify dependency generation script	2 months ago
.gitignore	gitignore: add emacs "swap files"	3 months ago
.mailmap	mailmap: cleanup shortlog stats for nixos-22.11 release	2 months ago
.version	23.05 is Stoa	2 months ago
CONTRIBUTING.md	CONTRIBUTING.md: clarify some directives about meta attributes	last month
COPYING	COPYING: 2022 -> 2023	last month
README.md	Release NixOS 22.11	2 months ago
default.nix	docs: add -L to remaining curl install commands	2 years ago
flake.nix	Merge pull request #194763 from hercules-ci/flake-improve-nixosM...	3 months ago

README.md



NixOS

contributors 7.7k supporters 281

About

Nix Packages collection

linuxnixnixosnixpkgs

hacktoberfest

ReadmeMIT licenseSecurity policy11.4k stars279 watching9.2k forks

Releases

113 tags

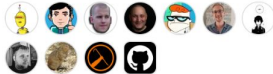
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Packages

No packages published

Contributors 4,967



+ 4,956 contributors

Languages

Nix96.6%

Shell1.8%

Python0.9%

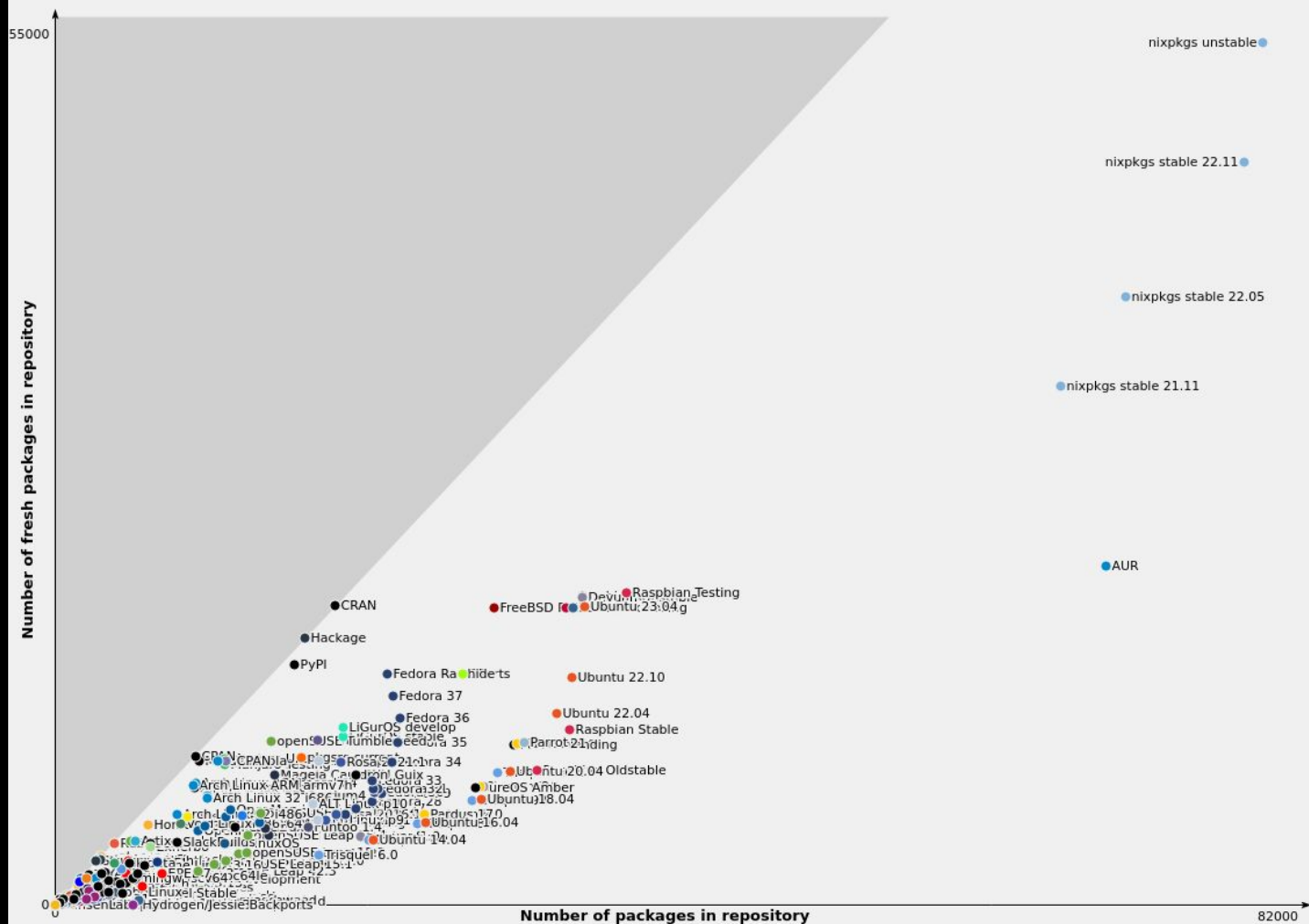
Perl0.3%

C0.2%

Ruby0.1%

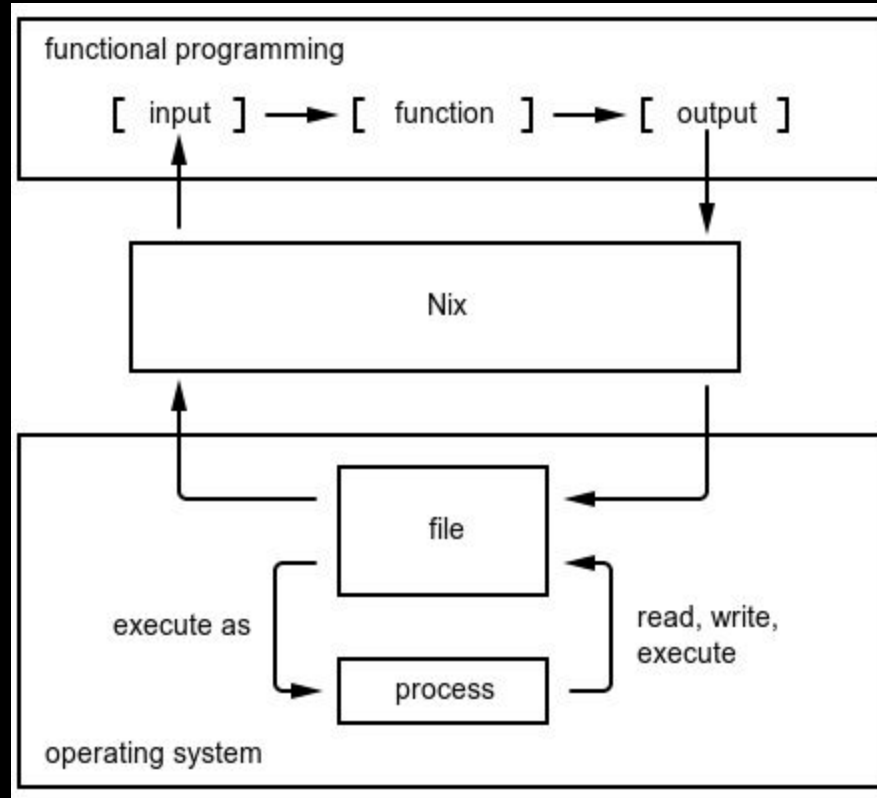
Other0.1%

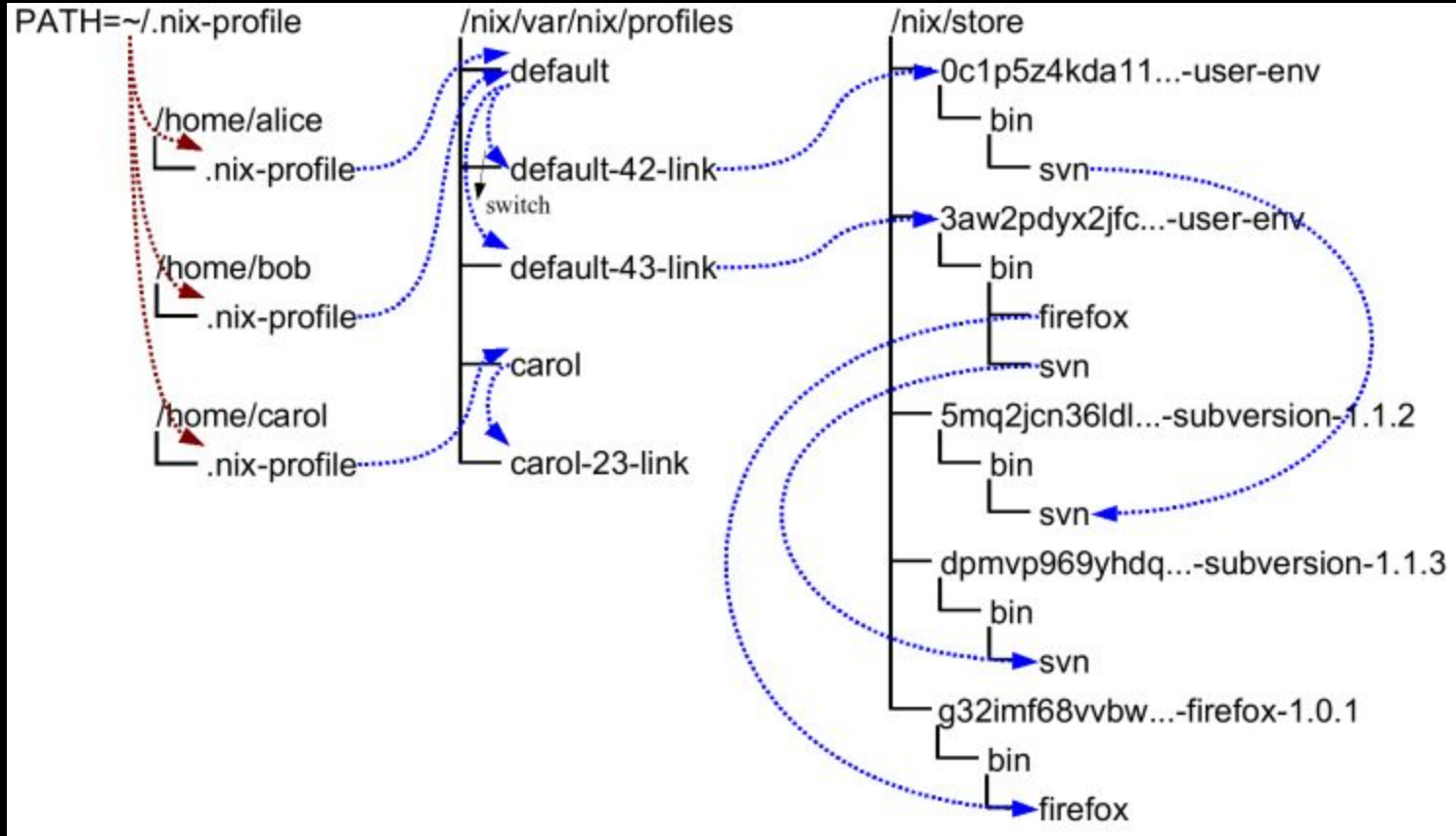
50



Nix, the mechanisms

<https://www.tweag.io/blog/2022-07-14-taming-unix-with-nix/>
<https://shopify.engineering/what-is-nix>
<https://nixos.org/guides/nix-pills/>
<https://nixos.org/manual/nix/stable/package-management/profiles.html>





Where to ask for help

<https://nixos.org/community/>
<https://discourse.nixos.org/>
<https://matrix.to/#/#community:nixos.org>
<https://discord.com/invite/RbvHtGa>





THANK YOU!

Let's make something great together.