

**Nix**



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# Table of Contents

---

- Nix the language
- NixOS
- Home-manager
- Flakes
- Specializations



# What is Nix?

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- just a programming language
- functional
  - lazy
  - everything is an expression
- turing complete
- made to configure environments
  - native paths
  - tooling for environments -> nixos etc



# Basics

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- haskell interactive shell
  - nix repl
- evaluate code in file
  - nix-instantiate
- comments: --
- function: argument:body
  - x: 5 + x
  - one argument only
  - more arguments == currying
- native types
  - lists
  - attribute set
  - functions
  - numbers, strings, **paths**, etc
- inbuilt functionality
  - import
  - lib.toString
  - std.mkDerivation



# Tricks

## let in

```
1 let
2   func = x: x * 2;
3 in {
4   func 24
5 }
6 -- 48
```

- **only in this scope**

## With

```
1 let
2   attrs = {
3     x = 10;
4     b = 55;
5     c = 34;
6   };
7 in with attrs; [
8   x
9   b
10  c
11 ];
```

## inherit

```
1 let
2   x = 1;
3   y = 2;
4 in {
5   inherit x y;
6 }
7 }
```

- copies the values in let to the scope in the curly brackets



# Packages

---

```
1 { stdenv
2   , lib
3   , pkgs
4   , fetchFromGitLab
5 }:
6
7 pkgs.python3.pkgs.buildPythonApplication rec {
8   pname = "pingpang";
9   version = "0.0.1";
10
11   src = fetchFromGitLab {
12     domain = "gitlab.globi.org";
13     owner = "globi";
14     repo = pname;
```



```
15     rev = version;
16     sha256 = "sha.something";
17 };
18
19 nativeBuildInputs = with pkgs; [
20     cargo
21 ];
22
23 buildInputs = with pkgs; [
24     gtk
25 ];
26
27 meta = with lib; {
28     -- homepage, architecture support, help page etc
29 };
30 }
```



# NixOS

---

- a GNU/Linux distribution
- fundamentally different file system design
  - nix store
  - otherwise just like any penguin variant
- only configures and installs system wide programs
  - use home-manager for user-based configuration





# Home-Manager

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- extension to nixos/nix-darwin
- user level variant of nixos
- available on other distributions
- configures user configuration files



# Flakes

---

- extension to nixos/homemanager
- removes the issue of hashes
  - enables easy updates of inputs
  - lock file
- technically an “experimental” feature



## Example

---

```
1 {  
2   description = "dots";  
3   inputs = {  
4     nixpkgs.url = "github:Nix0s/nixpkgs/nixos-unstable";  
5     home-manager = {  
6       url = "github:nix-community/home-manager";  
7       inputs.nixpkgs.follows = "nixpkgs";  
8     };  
9   };  
10  
11   outputs = { ... }@inputs:  
12     let  
13       pkgs = import inputs.nixpkgs {  
14         system = "x86_64-linux";
```



```
15         config = { allowUnfree = true; };
16     };
17     in {
18         nixosConfigurations."something" = inputs.nixpkgs.lib.nixosSystem
19     {
19         specialArgs = {
20             inherit inputs pkgs;
21             mod = ./hardware/something/base_config.nix;
22         };
23         modules = [ ./hardware/hardware.nix ]
24     };
25 };
26 }
```



# Overrides

---

```
1 new: old:
2 {
3   packages = old.packages.override {
4     package = new.newpackage;
5   };
6 }
```



## What else is Nix good for?

---

- servers
  - declarative/reproducible server instantiation
  - ansible on steroids
  - easily convertible to and from docker files/images
- CI/CD
  - declarative and reproducible pipelines
  - no version mismatch due to nix
  - available as a github runner -> nix-run
- dev environment
  - even on multiple operating systems