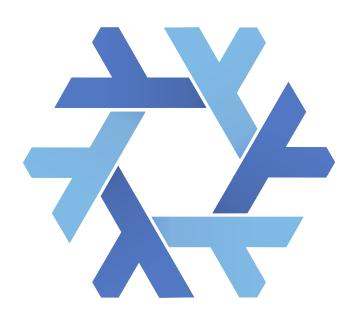
NIXOS

Malte Neuss



"Reproducible builds and deployments."



By Tim Cuthbertson CC BY 4.0, https://nixos.org

FEATURES

Nix Package Manager

- >60k packages
- many ecosystems Java, JS, Rust, Haskell...
- reproducible
- idempotent

```
$ nix-shell --packages jdk
```

Nix Language

- Declarative
- Functional
- No mutation
- No side-effects

```
mkDerivation {
  name = "myProject-1.0.0";
  src = ./src;
  buildInputs = [ maven jdk ];
}
```

NIX LANGUAGE

HOW STANDARDS PROLIFERATE: (SEE: A/C CHARGERS, CHARACTER ENCODINGS, INSTANT MESSAGING, ETC.)

SITUATION: THERE ARE 14 COMPETING STANDARDS.



SOON:

SITUATION:

THERE ARE

15 COMPETING

STANDARDS.

By https://xkcd.com/927/ CC BY-NC 2.5

NIX LANGUAGE

Pure, Functional, Lazy

- Strings "hello"
- Numbers 42
- List [1 2 3]
- Expressions 1+2+3
- Attribute Sets { }
- Functions f x

ATTRIBUTE SET

```
name = "myProject-1.0.0";
src = ./src;
buildInputs = [ maven jdk ];
...
}
```

Assignment:

```
three = 3;
myDerivation = { name = "myProject-1.0.0"; src = ... }
myName = myDerivation.name;
```

FUNCTIONS

Math

f:
$$\mathbb{R} \rightarrow \mathbb{R}$$

f(x) = 2x

Typescript

Nix

const
$$f = x \Rightarrow 2x$$
 $f(3)$

const
$$g = (x, y) => x+y$$

 $g(3, 4)$

$$f = x: 2*x$$
 f 3

$$g = x: y: x+y$$

 $g 3 4$

FUNCTIONS

```
mkDerivation {
  name = "myProject-1.0.0";
  src = ./src;
  ...
}
```

Resulting Derivation

DERIVATIONS

```
# shell.nix
let
  pkgs = import <nixpkgs> {};
in
pkgs.stdenv.mkDerivation {
  name = "myProject-1.0.0";
  src = ./src;
  buildInputs = [ pkgs.maven pkgs.jdk ];
  buildPhase = "maven clean build";
}
```

```
$ nix-build shell.nix
$ nix-shell shell.nix
```

NIXPKGS

(import <nixpkgs> {}) evaluates to:

```
{
    stdenv = { ... }
    ...
    maven = stdenv.mkDerivation {... jdk ...}
    jdk = ...
    jdk11 = ...
    ...
    git = ....
    ...
    firefox = ...
}
```

https://github.com/NixOS/nixpkgs

DEMO

NIX PACKAGE MANAGER

Store

```
/nix/store/9234jfkdfj23j45r2102jfd-maven-2.0.0
/nix/store/34234sdfjskdfj32j4kjdsf-maven-3.0.0
/nix/store/sdf34dfkjlkj09u123123ss-maven-3.0.0
...
/nix/store/fsdkf234jdfdsfjkj0111df-jdk-1.8.0
..
```



```
...
boot.loader.grub.device = "/dev/sda";
boot.kernelPackages = pkgs.linuxPackages_latest;
...

users.users.mneuss = {
  isNormalUser = true;
  home = "/home/mneuss";
  extraGroups = [
    "wheel" # Enable 'sudo' for the user.
    "docker"
    "network-manager" ];
```

nixos-rebuild switch

FURTHER STUDY



- Main Page https://nixos.org/
- Cloud Deployment https://github.com /NixOS/nixops
- My Blog https://lambdablob.com/
- Switch Dev
 Environments
 https://direnv.net/

