



not-all-packages-anymore.nix

Silvan Mosberger
@infinisil

What is was all-packages.nixfix

```
# pkgs-ng/system/all-packages.fix

{system}: rec
  { stdenv = (import ../../stdenv)
    { system = system
    }

  , fetchurl = (import ../../fetchurl)
    { system = system
    }

  , aterm = (import ../../aterm)
    { system = system
    , fetchurl = fetchurl
    , stdenv = stdenv
    }
  }
```

```
commit 55161eff7c006ce9cb98d38a1623c3c65dabd003
Author: Eelco Dolstra <eelco.dolstra@logicblox.com>
Date:   Thu Oct 30 17:01:49 2003 +0000
```

* New-style Fix expressions.

```
svn path=/nixpkgs/trunk/; revision=444
```

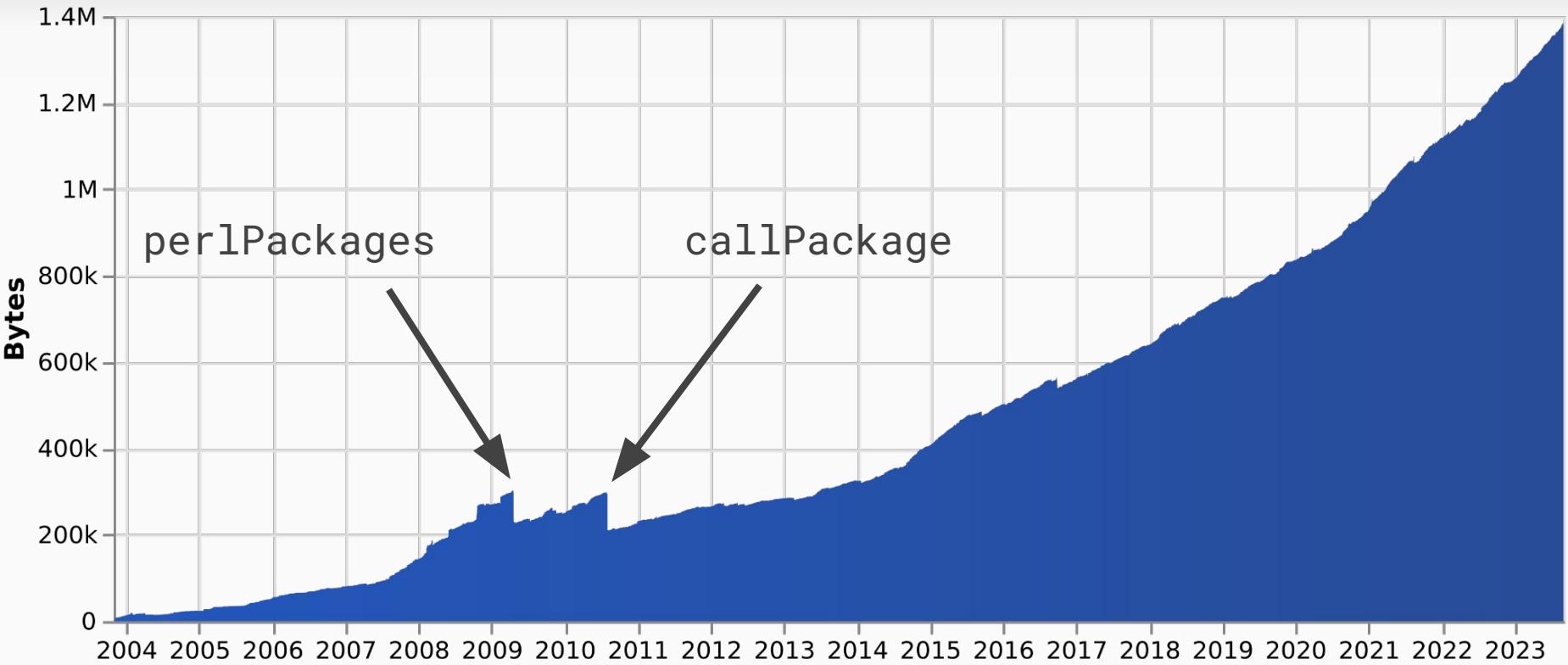
```
commit 33f773c97ad36a2b9f9c9599f12ca12d655517f1
Author: Eelco Dolstra <eelco.dolstra@logicblox.com>
Date:   Fri Oct 31 13:12:20 2003 +0000
```

* Improved prototype.

```
svn path=/nixpkgs/trunk/; revision=447
```

```
rename from pkgs-ng/system/default.fix
rename to pkgs-ng/system/all-packages.fix
```

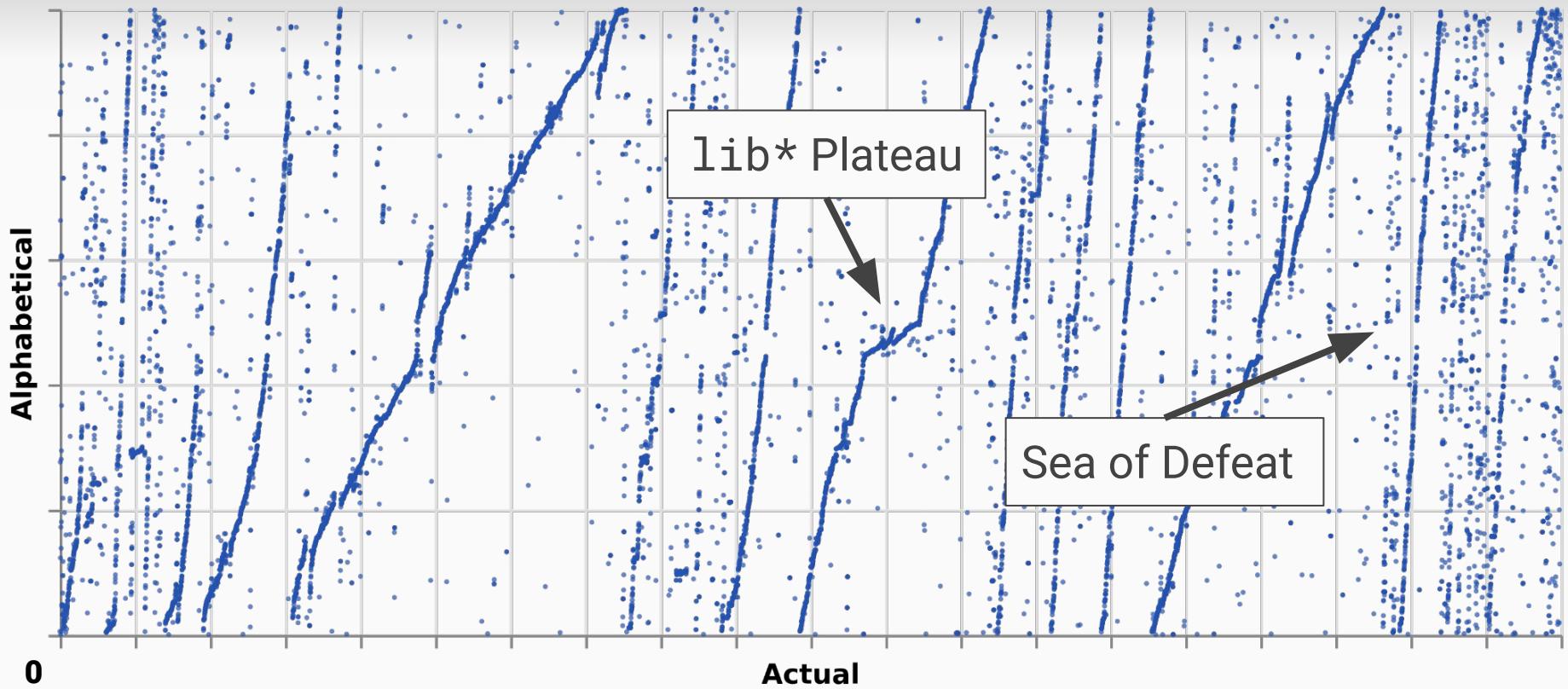
Size of all-packages.nix



What is all-packages.nix now

```
223 chkservice = callPackage ../tools/admin/chkservice { };
224
225 addOpenGLRunpath = callPackage ../build-support/add-opengl-runpath { };
226
227 quickemu = callPackage ../development/quickemu { };
...
42265 wpm = callPackage ../applications/misc/wpm { };
42266
42267 yazi = callPackage ../applications/file-managers/yazi {
42268     inherit (darwin.apple_sdk.frameworks) Foundation;
42269 };
42270
42271 ssl-proxy = callPackage ../tools/networking/ssl-proxy { };
42272 }
```

Attribute order in all-packages.nix



Category directories in pkgs



2014: builtins.readDir PR

Add readdir primop #235

Conversation 4 Commits 2 Checks 0 Files changed 5 +18 -0 ████



shlevy commented on Apr 1, 2014

Member

...

This is useful for things like nix-make, and may make nixpkgs's organization cleaner



shlevy added 2 commits 9 years ago

– Add test for readdir builtin

Unverified

730cf9d

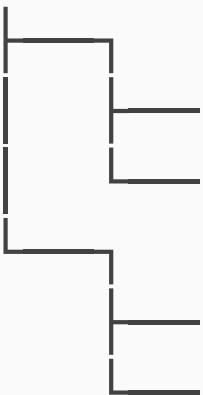
– Add readdir primop ...

Unverified

5bfd288

The basic idea

Standardised
file layout



readDir
callPackage



Package
attribute set

{
...
...
}

2018: First known prototype

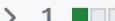
12:55 <**infinisil**> Regarding the pkgs structure, how about using directories like `pkgs/{aa,ab,ac,...}` for the starting letters of the package name (and potentially another level).

prototype Browse files

 **new-pkgs**

 **infinisil** committed on Apr 20, 2018 Verified 1 parent a9cd8ef commit bb20eфе

> 1  new-pkgs/pkgs/bc/_/bc ...

> 1  new-pkgs/pkgs/mi/ne/minecraft ...

2022: Nixpkgs Architecture Team (NAT)

- **Created and lead by me**
 - 7 current members
 - Discussions open for all
- **Clean Nixpkgs, ideas:**
 - Redesign mkDerivation
 - Unify overriding
 - Improve CI
 - Refactor stdenv
 - ...



@infinisil (team lead)



@roberth



@tomberek



@Ericson2314



@growpotkin/@aakropotkin



@DavHau



@phaer

Idea brought to the NAT



K900

17:26

We should just do a [crates.io](#) and organize packages by name



2

17:26

pkgs/h/e/hello/default.nix (edited)

17:26

(no)

17:26

(unless?)



Focus!

– Valentin, Nixcon 2022

Discussed in the NAT

➊ To do sharding or not

#1 opened on Sep 3, 2022 by infinisil



6

➋ Make sure Nix lazy trees is not regression

#2 by infinisil was closed on Dec 5, 2022



2

➌ Don't have an `auto` directory



5

#3 by infinisil was closed on Nov 14, 2022

➍ Reduce scope to do file moves and avoid `readDir` for now?

1

#4 by roberth was closed on Sep 21, 2022

➎ Mention related work

4

#5 by Ericson2314 was closed on Dec 19, 2022

➏ Don't auto- `callPackage`



3

RFC opened

[RFC 0140] Simple Package Paths #140

[Edit](#)[Code ▾](#)[Open](#)

infinisil wants to merge 1 commit into [NixOS:master](#) from [nixpkgs-architecture:master](#) 

[Conversation 0](#)[Commits 1](#)[Checks 0](#)[Files changed 1](#)[+395 -0](#) 

infinisil commented on Jan 30

[Member](#) [...](#)

Summary

Auto-generate trivial top-level attribute definitions in [pkgs/top-level/all-packages.nix](#) from a directory structure that matches the attribute name.

This makes it much easier to contribute new packages since there's no more guessing needed as to where the package should go, both in the ad-hoc directory categories and in [pkgs/top-level/all-packages.nix](#).

[Rendered](#)

Reviewers

No reviews

Still in progress? Convert to draft



Assignees

No one—assign yourself



Labels

None yet



RFC accepted!

[RFC 0140] Simple Package Paths #140

[Edit](#)[Code ▾](#)

edolstra merged 25 commits into [NixOS:master](#) from [nixpkgs-architecture:master](#) on Jul 12

[Conversation 253](#)[Commits 25](#)[Checks 0](#)[Files changed 1](#)[+395 -0](#) 

infinisil commented on Jan 30 • edited

[Member](#) ...

Summary

Auto-generate trivial top-level attribute definitions in Nixpkgs' [pkgs/top-level/all-packages.nix](#) from a Nixpkgs-internally standardised directory structure that matches the attribute name.

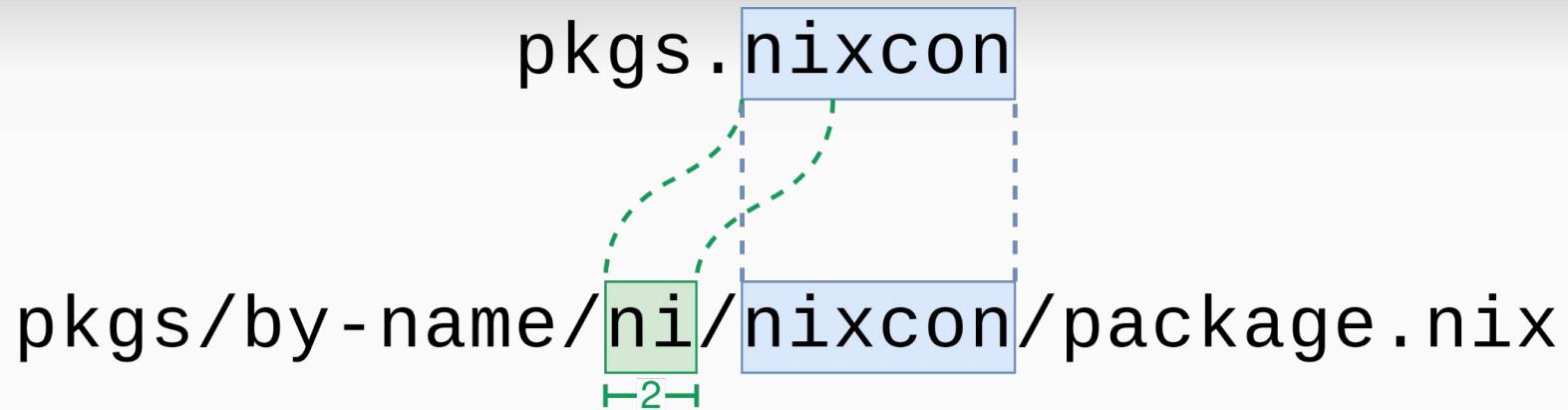
This makes it much easier to contribute new packages, since there's no more guessing needed as to where the package should go, both in the ad-hoc directory categories and in [pkgs/top-level/all-packages.nix](#).

Rendered

Reviewers

[FRidh](#)[cole-h](#)[Mindavi](#)[SuperSandro2000](#)[figsoda](#)[AndersonTorres](#)

The accepted design



Automatically
imported with

```
callPackage .../package.nix {}
```

Current limitations

- Not for packages in nested package sets
- Non-empty callPackage arguments still need `all-packages.nix`

```
nixcon = callPackage ../../by-name/ni/nixcon/package.nix {  
    enableHackday = true;  
};
```

- Packages defined using functions other than callPackage also can't be in `pkgs/by-name`

```
nixcon = python3Packages.callPackage ../../conferences/nixcon { };
```

Current limitations

~80% of definitions in
all-packages.nix can be removed!

Checking tool

pkgs/by-name

└─ ge

 └─ germany.nix

```
$ nix-build nixpkgs -A tests.nixpkgs-check-by-name  
/nix/store/[...]-nixpkgs-check-by-name  
$ result/bin/nixpkgs-check-by-name nixpkgs
```

This path is a file, but it should be a directory.

└─ ni

 └─ libnix

 └─ package.nix

Incorrect directory location, should be
pkgs/by-name/li/libnix instead.

└─ nix-

 └─ package.nix

Invalid package directory name "nix-", must be ASCII
characters consisting of a-z, A-Z, 0-9, "-" or "_" .

└─ nixcon

Missing required "package.nix" file.

Checking tool

```
# pkgs/by-name/st/string/package.nix      pkgs.string: This attribute is not a derivation
{ lib }:                                "I am ${lib.version}!"
```

```
# pkgs/by-name/ni/nixcon/package.nix      pkgs.nixcon: This attribute is not defined as
# pkgs/top-level/all-packages.nix          pkgs.callPackage ../ni/nixcon/package.nix { ... }
nixcon = callPackage
  ./conferences/nixcon { };
```

The file structure is not an API

```
# pkgs/by-name/ni/nixcon/package.nix

{ stdenv }:
stdenv.mkDerivation {
  pname = "nixcon";

  patches = [
    ../../ge/germany/more-nixers.patch
  ];
}

File contains the path expression "../../ge/germany/more-nixers.patch"
which may point outside the directory of that package.
```

The package set is an API

```
# pkgs/by-name/ni/nixcon/package.nix
```

```
{ stdenv, germany }: stdenv.mkDerivation {  
    pname = "nixcon";  
  
    patches = [  
        germany.moreNixersPatch  
        ./more-nixers.patch  
    ];  
}
```

All inputs should come from arguments

This can be exposed using `passthru`

Or copy the file to the local directory

Fast CI checks

How to run the tool predictably and quickly for all PRs:

- Let Hydra build it
- Include it in a channel
- Have CI fetch/run the pre-built result



All checks have passed

23 successful checks

[Hide all checks](#)



Check pkgs/by-name / check (pull_request) Successful in 36s

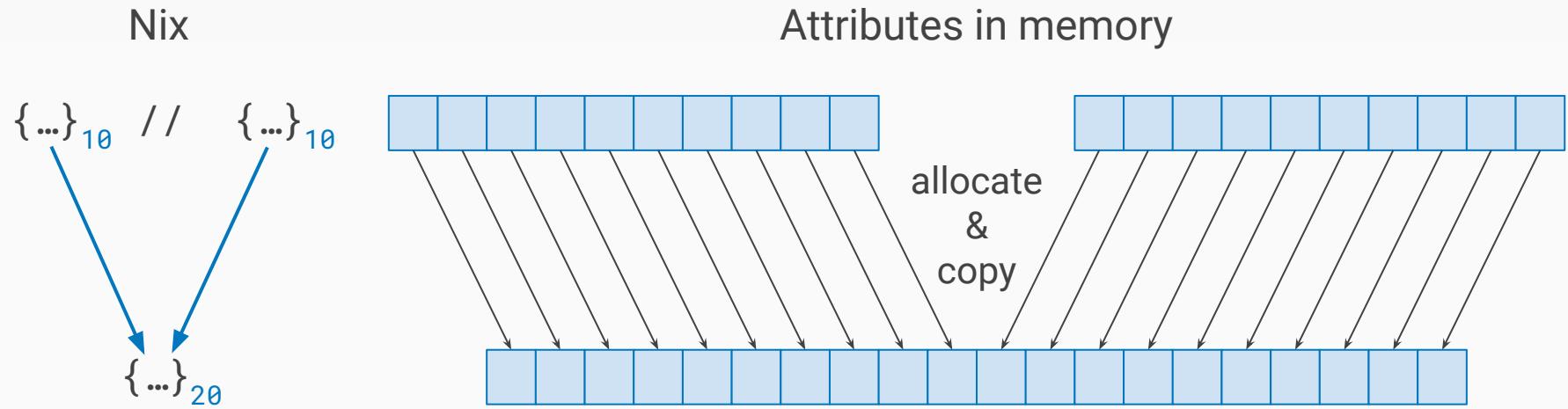
[Details](#)

Using readdir

```
pkgs/by-name          readdir ./aa → { aacgain = ...; aalib = ...; ... }  
  └── aa              readdir ./ab → { abc-verifier = ...; abcl = ...; ... }  
    ├── aacgain  
    └── aalib  
    ┌─  
    └─ ab              ...  
      ├── abc-verifier  
      └── abcl          readdir ./zx → { zxcvbn-c = ...; zxing = ...; ... }  
      ┌─  
      └─ zx              readdir ./zz → { zz = ...; zziplib = ...; ... }  
        ┌─  
        └─ zz              {  
          aacgain = ...; aalib = ...; ...  
          abc-verifier = ...; abcl = ...; ...  
          ...  
          zxcvbn-c = ...; zxing = ...; ...  
          zz = ...; zziplib = ...; ...  
        }
```

But we want this:

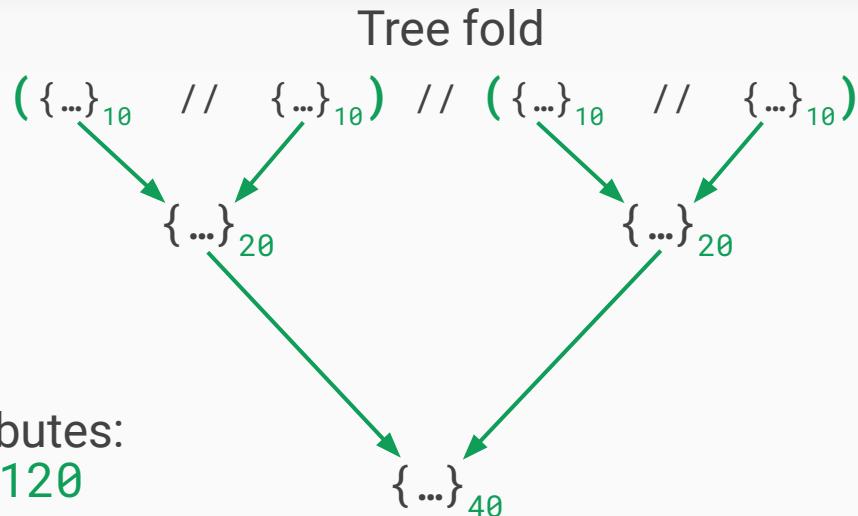
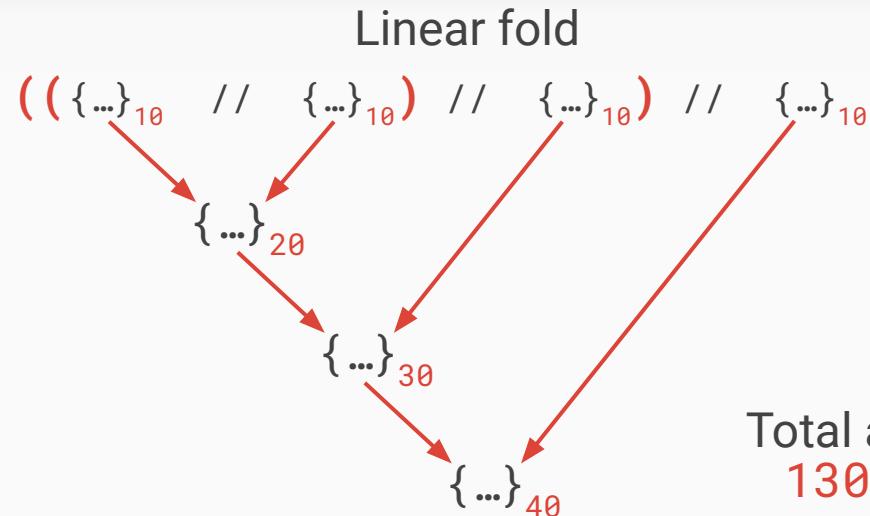
Attribute Allocations for //



Assuming no duplicate names, in total **40** attributes allocated!

Check yourself with `sets.elements` from `NIX_SHOW_STATS=1`

Different ways to fold using //



Total attributes:
130 vs 120

Complexity:
 $O(n^2)$ vs $O(n \log(n))$

Different ways to fold using //



This can be used today!



Name	Last commit message	Last commit date
as/asciiquarium-transparent	asciiquarium-transparent: init at unstable-2023-02-19 (#2534...)	2 days ago
ga	gash-utils: init at 0.2.0	2 days ago
he/hello	hello: Move to pkgs/by-name	2 days ago
sc/screentest	screentest: init at unstable-2021-05-10	42 minutes ago
ss/sssnake	sssnake: init at 0.3.2 (#253441)	2 days ago
wa/wayland-logout	wayland-logout: init at 1.4	2 days ago
README.md	pkgs/by-name: Fix minor mistake in README	yesterday

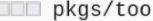
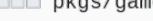
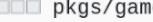
Automated migration plan

- Same evaluation result
- Only moving files, no changes
- **~70% of definitions in `all-packages.nix`**
can be removed automatically!
- Will cause merge conflicts (trivial to resolve)
- Enforced for new packages

Automated migration plan

[RFC 140] Simple package paths, part 2: Automated migration #211832

Conversation 9 Commits 10 Checks 7 Files changed 13,321 +274 -21,442

- > 21,681  pkgs/top-level/all-packages.nix 
- > 0  pkgs/games/_Overkill/default.nix → pkgs/by-name/_0/_Overkill/pkg-fun.nix 
- > 0  pkgs/tools/misc/_0x/default.nix → pkgs/by-name/_0/_0x/pkg-fun.nix 
- > 0  pkgs/games/_1oom/default.nix → pkgs/by-name/_1/_1oom/pkg-fun.nix 
- > 0  pkgs/applications/misc/_1password/default.nix → pkgs/by-name/_1/_1password/pkg-fun.nix 
- > 0  pkgs/games/_2048-in-terminal/default.nix → pkgs/by-name/_2/_2048-in-terminal/pkg-fun.nix 

Not covered here

- Historical auto-packages.nix
- Contributor documentation cleanup
- **package.nix** vs **default.nix**
- Overlay to check callPackage argument
- Attribute location information
- Case-insensitive package names
- Refactoring to standard callPackage
- CI exception list
- Alternate sharding schemes, shard counts
- Nix import-value cache

Future work

- Expose package functions API
- Move NixOS modules next to their packages
- Nested package sets
- Have a better solution for custom callPackage arguments
- Better alias handling
- RFC to develop RFCs in repositories
- Replacement for lost categorisation, [RFC 146](#) by @AndersonTorres
- Differentiating RFC authors and shepherds

Community Shout-outs

Nixpkgs Architecture Team

RFC co-author



@roberth - Robert Hensing
Founder of hercules-ci.com
Nix-first CI/CD

Reviewers



@aakropotkin/ - Alex Ameen
@growpotkin



@Ericson2314 - John Ericson



@tomberek - Thomas Bereknyei

RFC Shepherds and reviewers



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@zmitchell



@Artturin



@gilice



@oxij



@AndersonTorres



@7c6f434c



@edolstra



@rhendric



@Quantenzitron



@KFearsoff



@davidak



@figsoda



@sternenseemann



@fricklerhandwerk



@SuperSandro2000



@gytis-ivaskevicius



Tweag's Nix Services:



Assessment



Initial set up
and migration



Training



Tuning &
maintenance



Upstreaming

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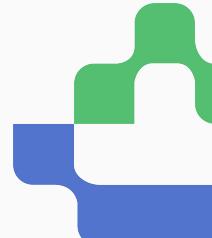


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You can also check out [The Nix Hour](#) on YouTube.



Extra: Attribute indices over time

