

Develop at Scale with Nx Monorepos



Why Monorepos?

01

**Atomic
Changes**

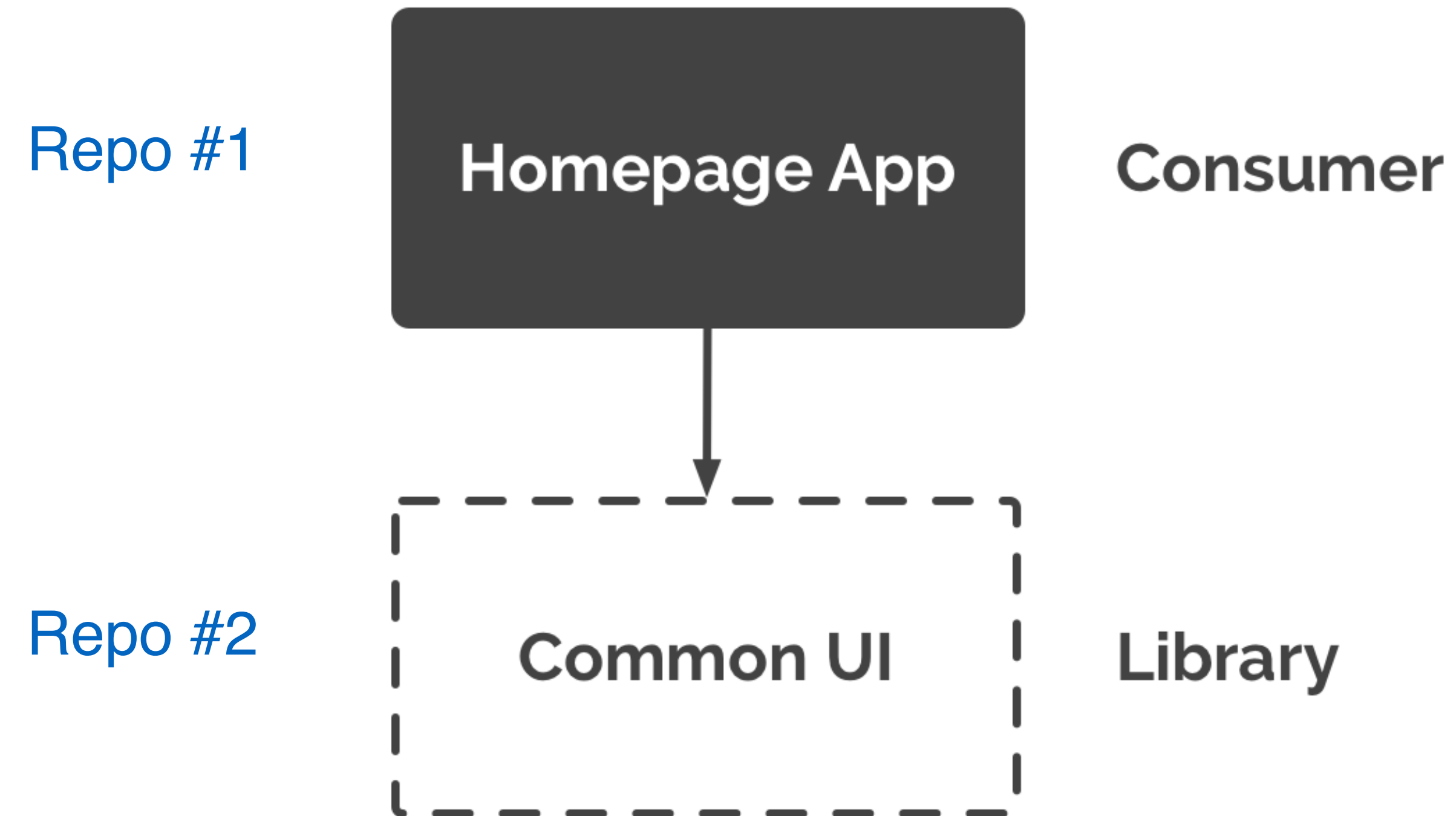
02

**Shared
Code**

03

**Single Set of
Dependencies**

01 Atomic Changes



Why Monorepos?

01

**Atomic
Changes**

02

**Shared
Code**

03

**Single Set of
Dependencies**

02 Shared Code



```
function usernameIsValid(username: string): boolean {  
    return username.length > 4 && username !== 'jeffbcross';  
}
```

Why Monorepos?

01

**Atomic
Changes**

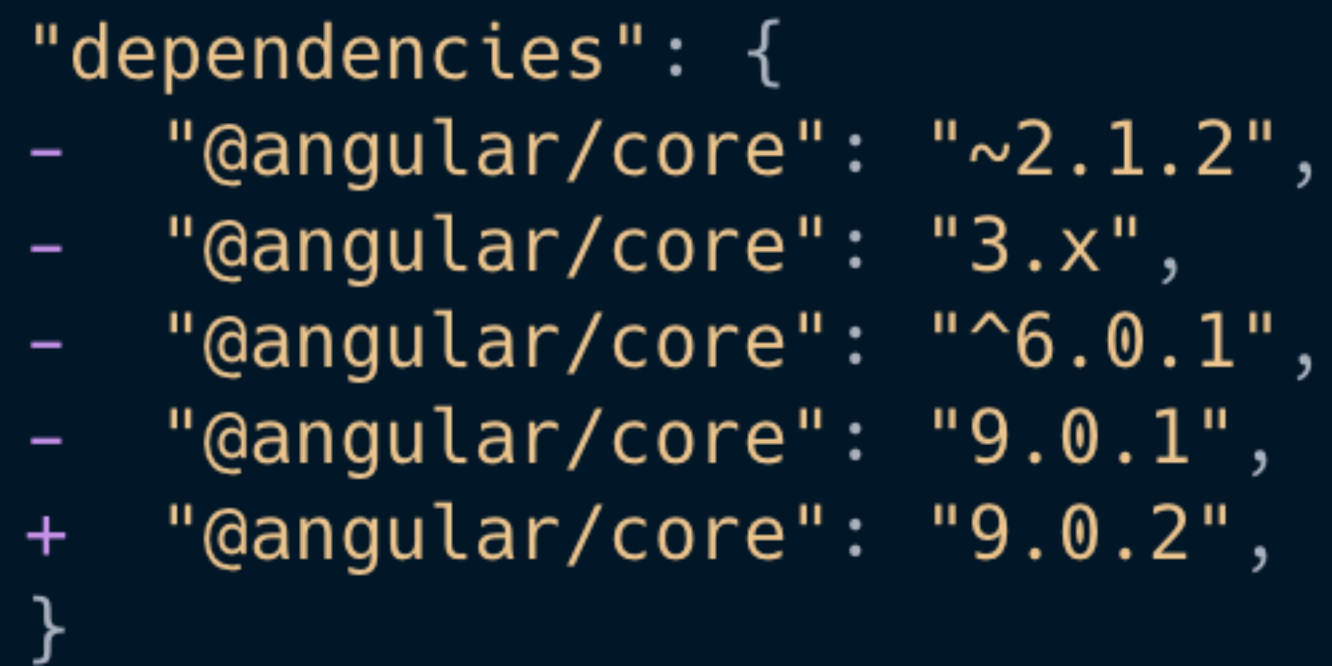
02

**Shared
Code**

03

**Single Set of
Dependencies**

03 Single Set of Dependencies



```
"dependencies": {  
-  "@angular/core": "~2.1.2",  
-  "@angular/core": "3.x",  
-  "@angular/core": "^6.0.1",  
-  "@angular/core": "9.0.1",  
+  "@angular/core": "9.0.2",  
}
```

Why Not Code Collocation?

01

**Running
Unnecessary
Tests**

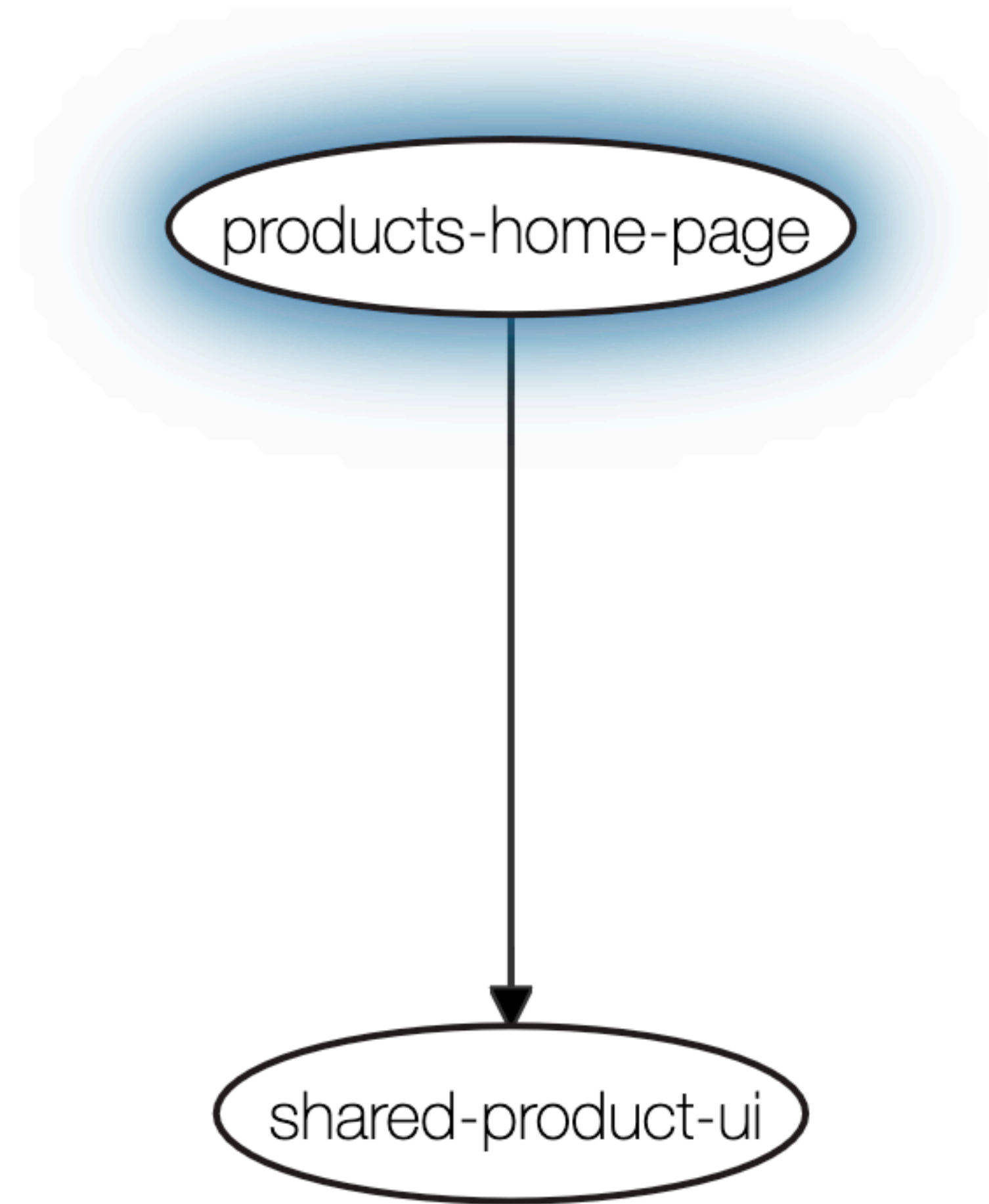
02

**No Code
Boundaries**

03

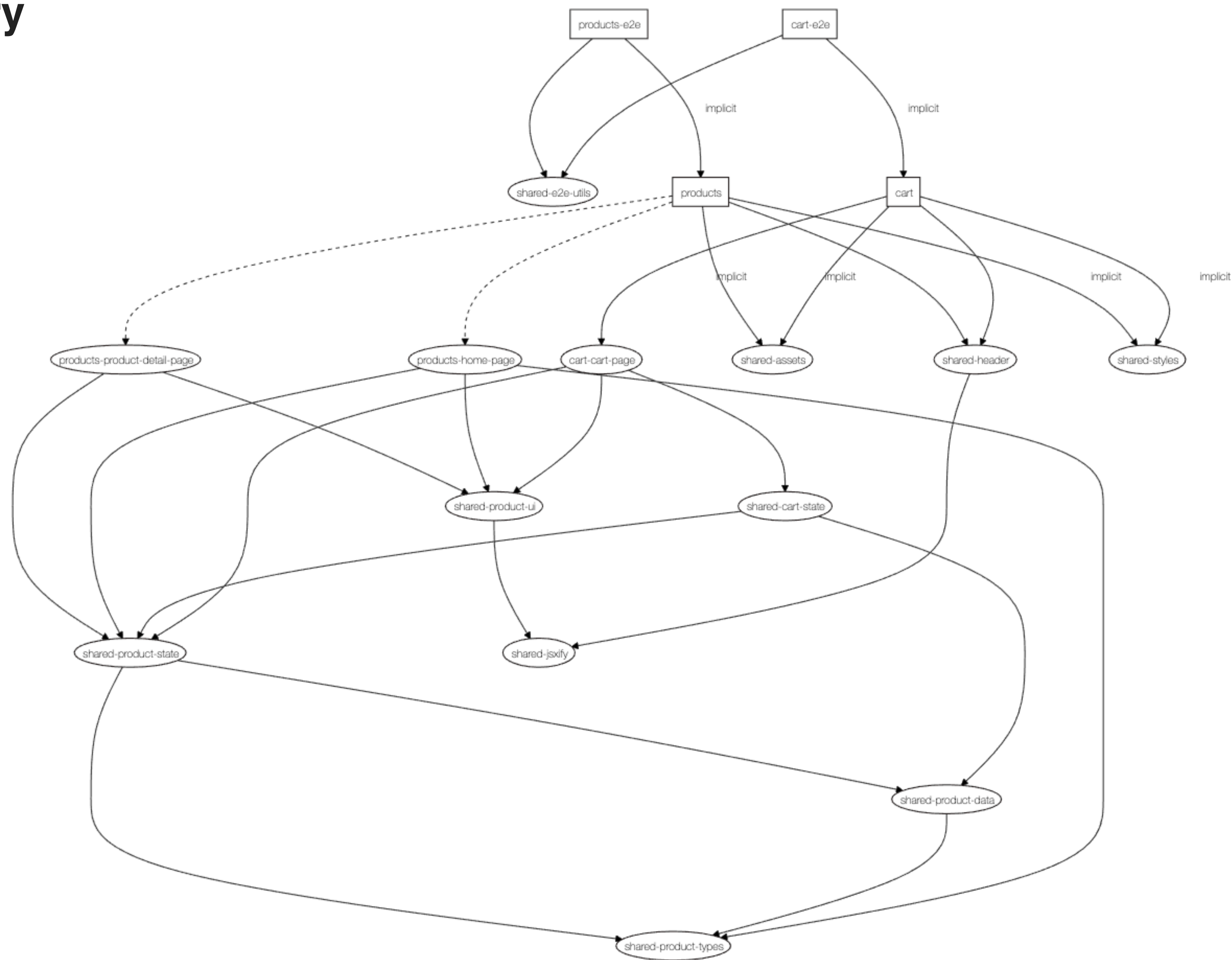
**Inconsistent
Tooling**

01 Running Unnecessary Tests



01

Running Unnecessary Tests



Why Not Code Collocation?

01

**Running
Unnecessary
Tests**

02

**No Code
Boundaries**

03

**Inconsistent
Tooling**

02 No Code Boundaries



```
import { unstableDontUse } from '@myorg/shared-ui/i/hope/no/one/finds/this';
```

Why Not Code Collocation?

01

**Running
Unnecessary
Tests**

02

**No Code
Boundaries**

03

**Inconsistent
Tooling**

03 Inconsistent Tooling



```
npm run launch-homepage-app --exceptOnTuesdays  
npm run build-shared-ui --turnOnProductionFlags  
npm run i-forget-what-this-does --butItRunsEveryWeek
```

Why Not Code Collocation?

01

**Running
Unnecessary
Tests**

02

**No Code
Boundaries**

03

**Inconsistent
Tooling**

Nx Can Help

- 01 Faster Command Execution
- 02 Controlled Code Sharing
- 03 Consistent Coding Practices
- 04 Accurate Architecture Diagram

01 Faster Command Execution

- Executors
- nx affected
- Local and distributed caching

Nx Can Help

- 01 Faster Command Execution
- 02 Controlled Code Sharing
- 03 Consistent Coding Practices
- 04 Accurate Architecture Diagram

02 Controlled Code Sharing

- Library API
- Tags
- Publishable Libraries
- CODEOWNERS

Nx Can Help

- 01 Faster Command Execution
- 02 Controlled Code Sharing
- 03 Consistent Coding Practices
- 04 Accurate Architecture Diagram

03 Consistent Coding Practices

- Linting
- Generators
- Nrwl Plugins
- Community Plugins

Nx Can Help

- 01 Faster Command Execution
- 02 Controlled Code Sharing
- 03 Consistent Coding Practices
- 04 Accurate Architecture Diagram

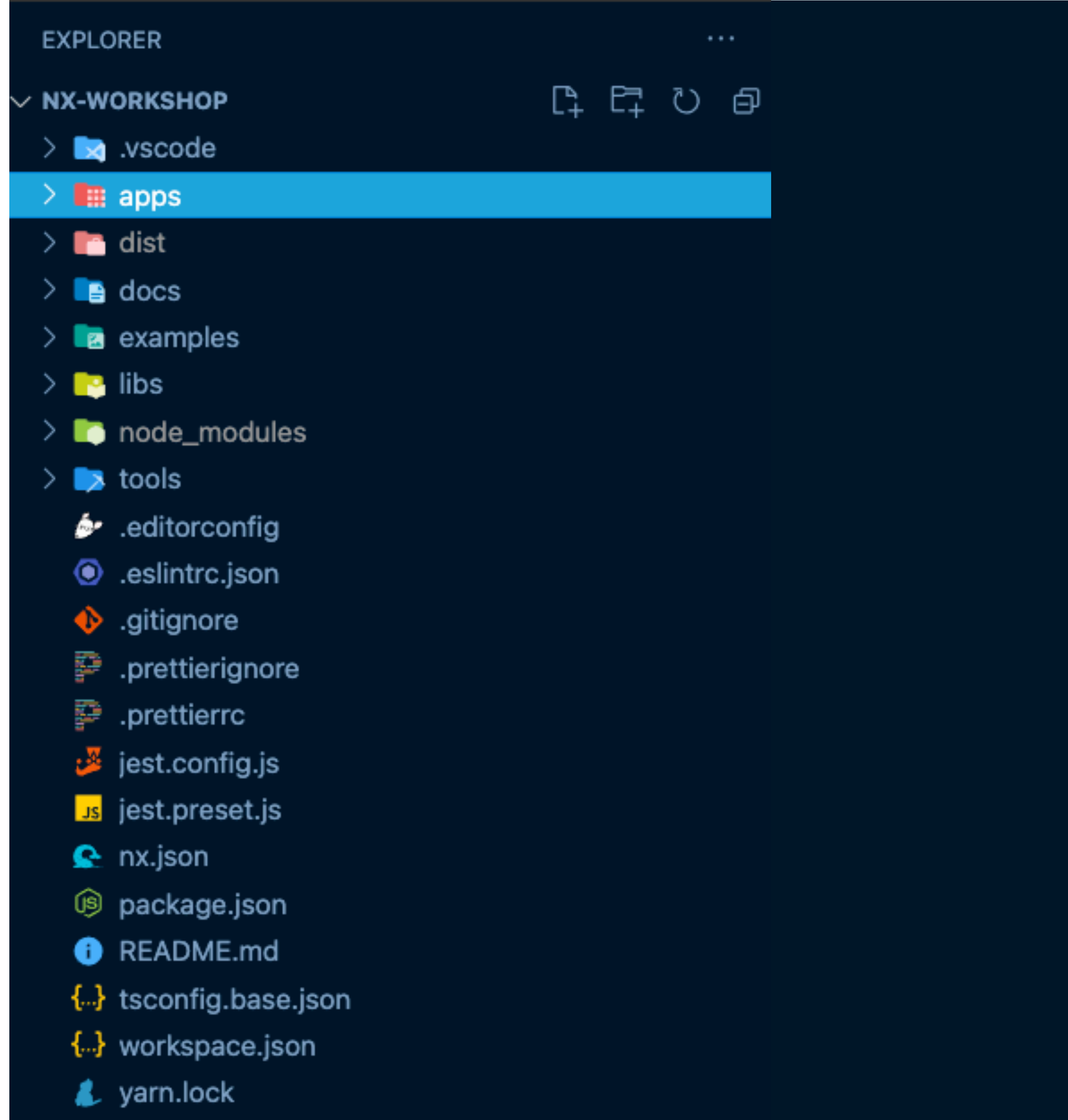
04 Accurate Architecture Diagram

- nx dep-graph

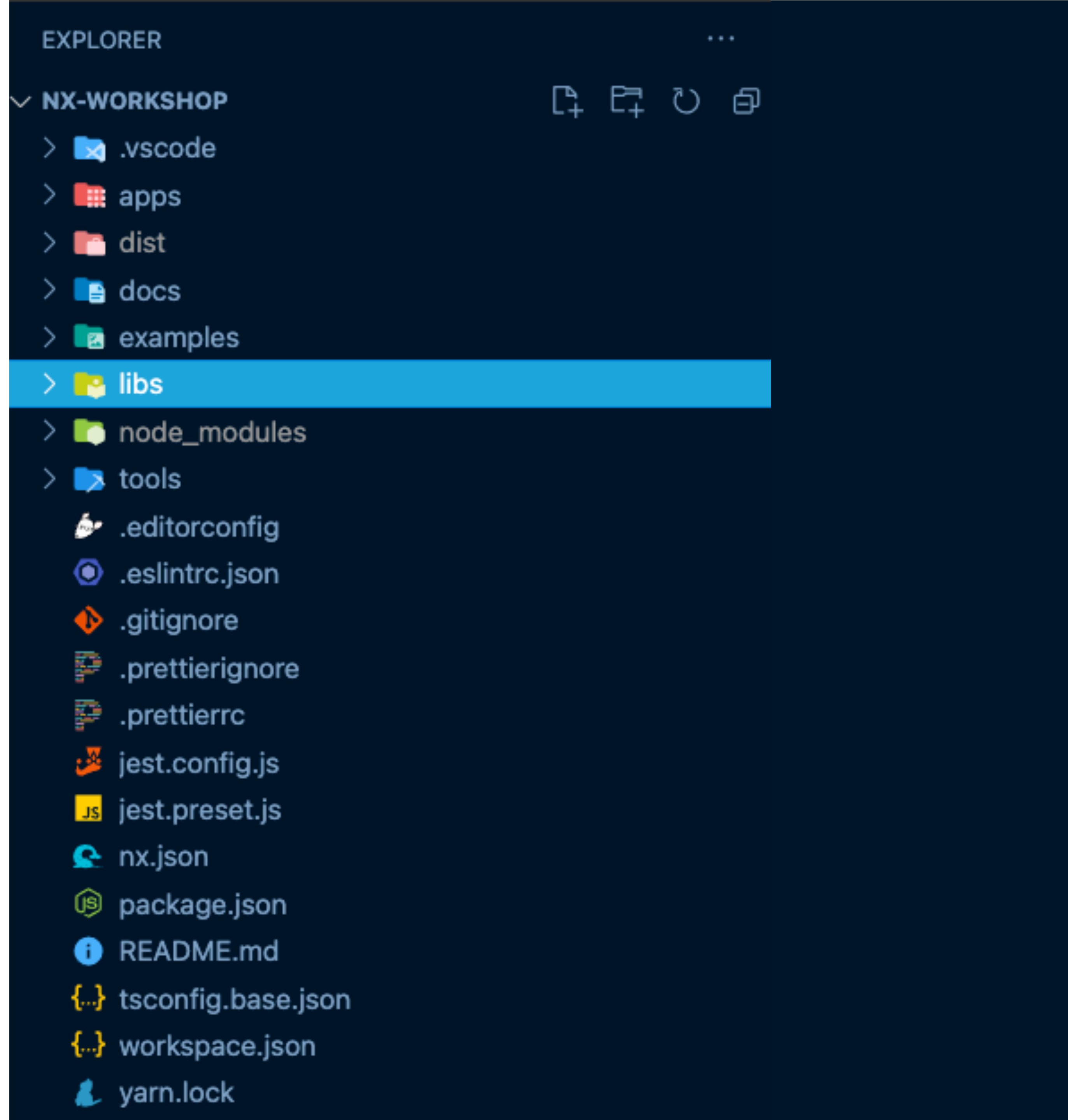
Nx Can Help

- 01 Faster Command Execution
- 02 Controlled Code Sharing
- 03 Consistent Coding Practices
- 04 Accurate Architecture Diagram

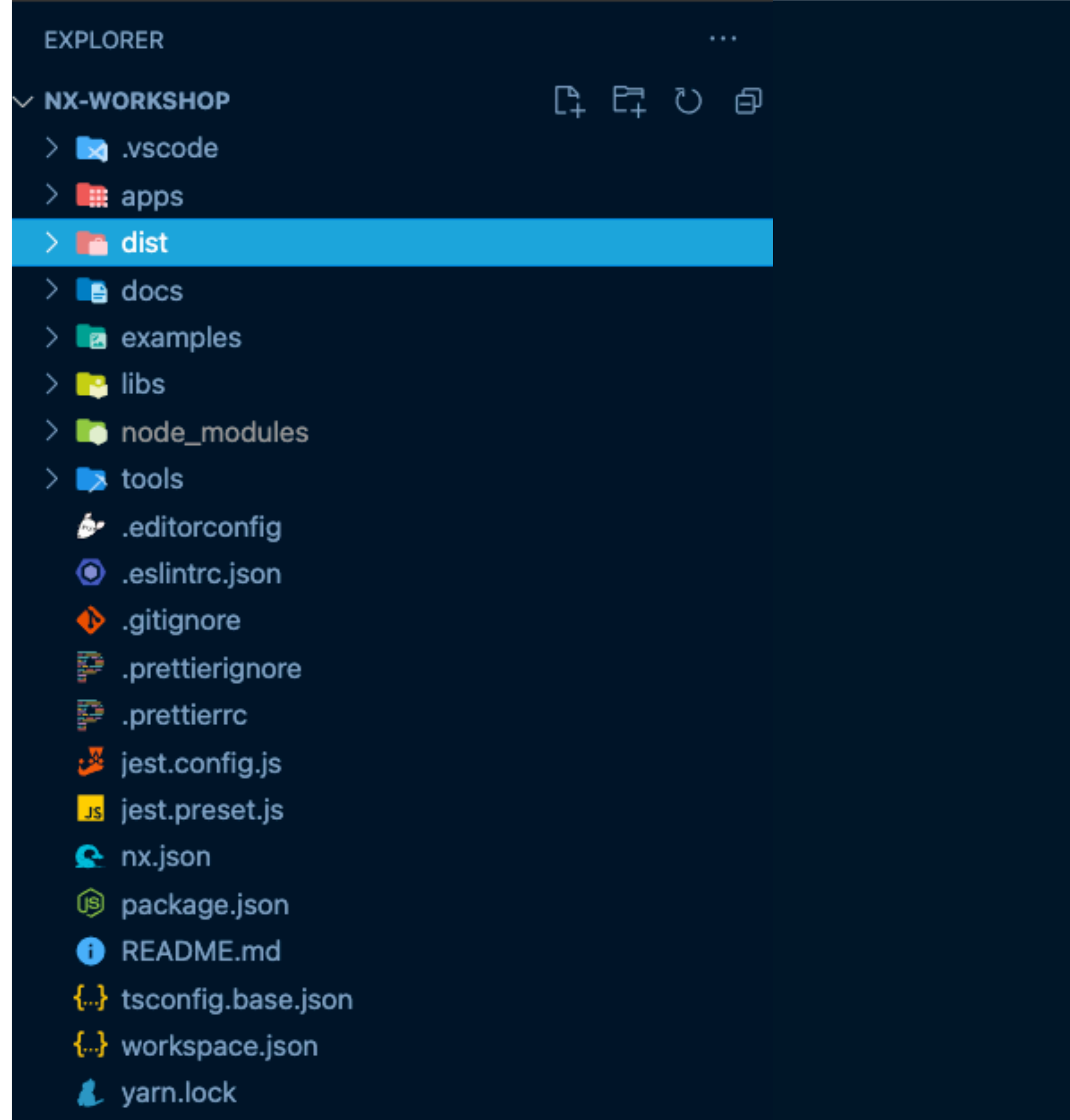
Workspace File Structure



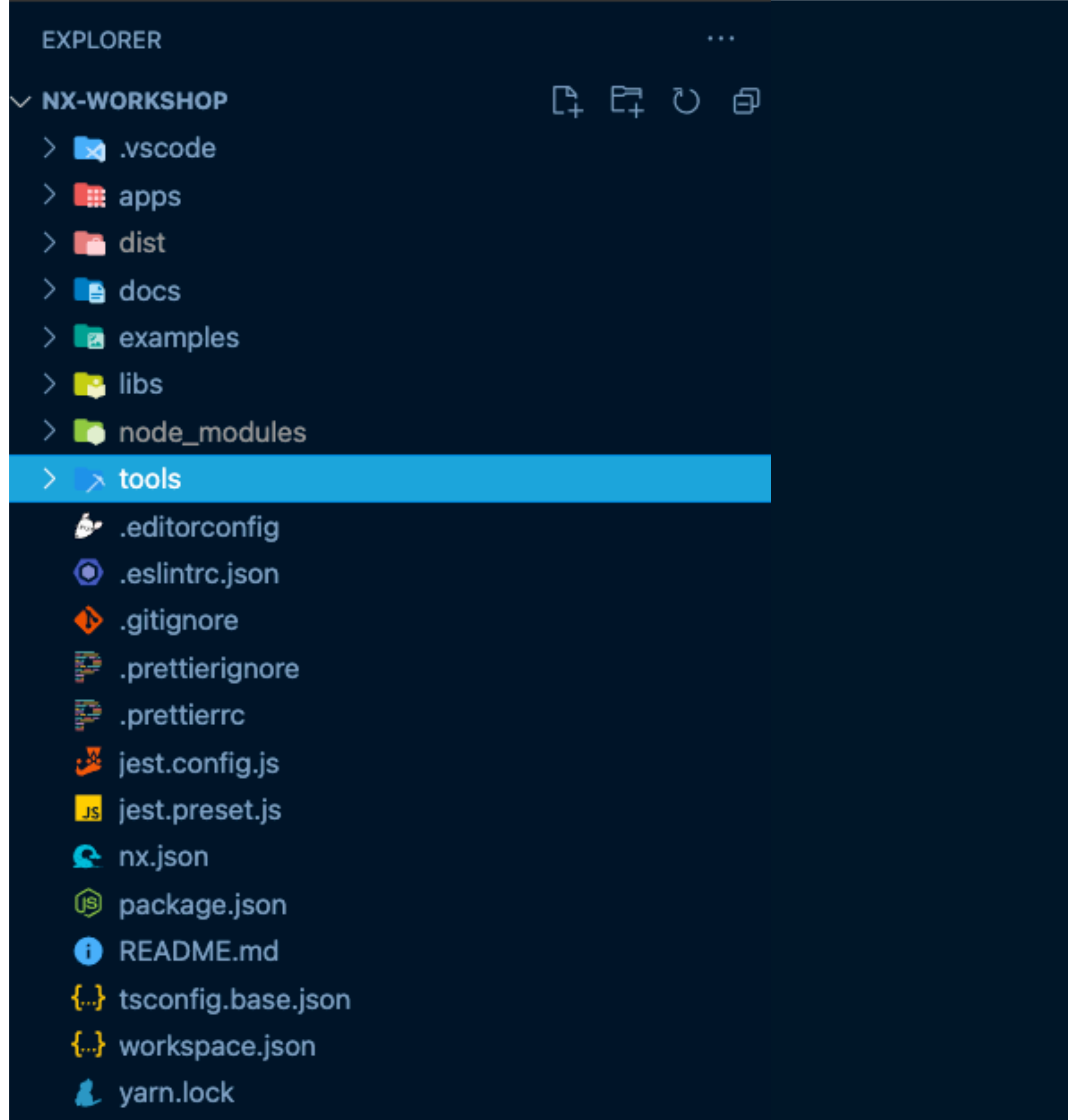
Workspace File Structure



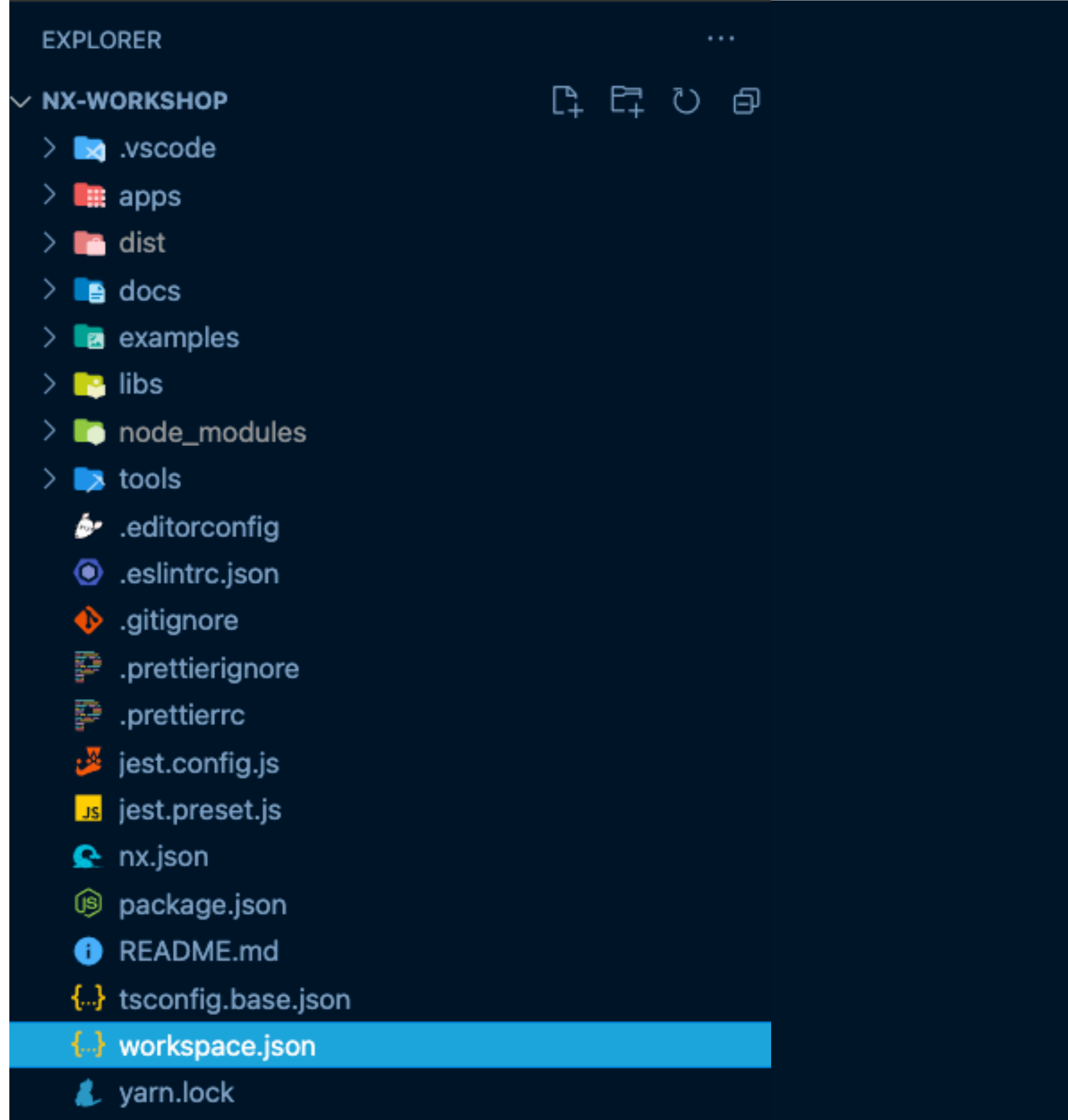
Workspace File Structure



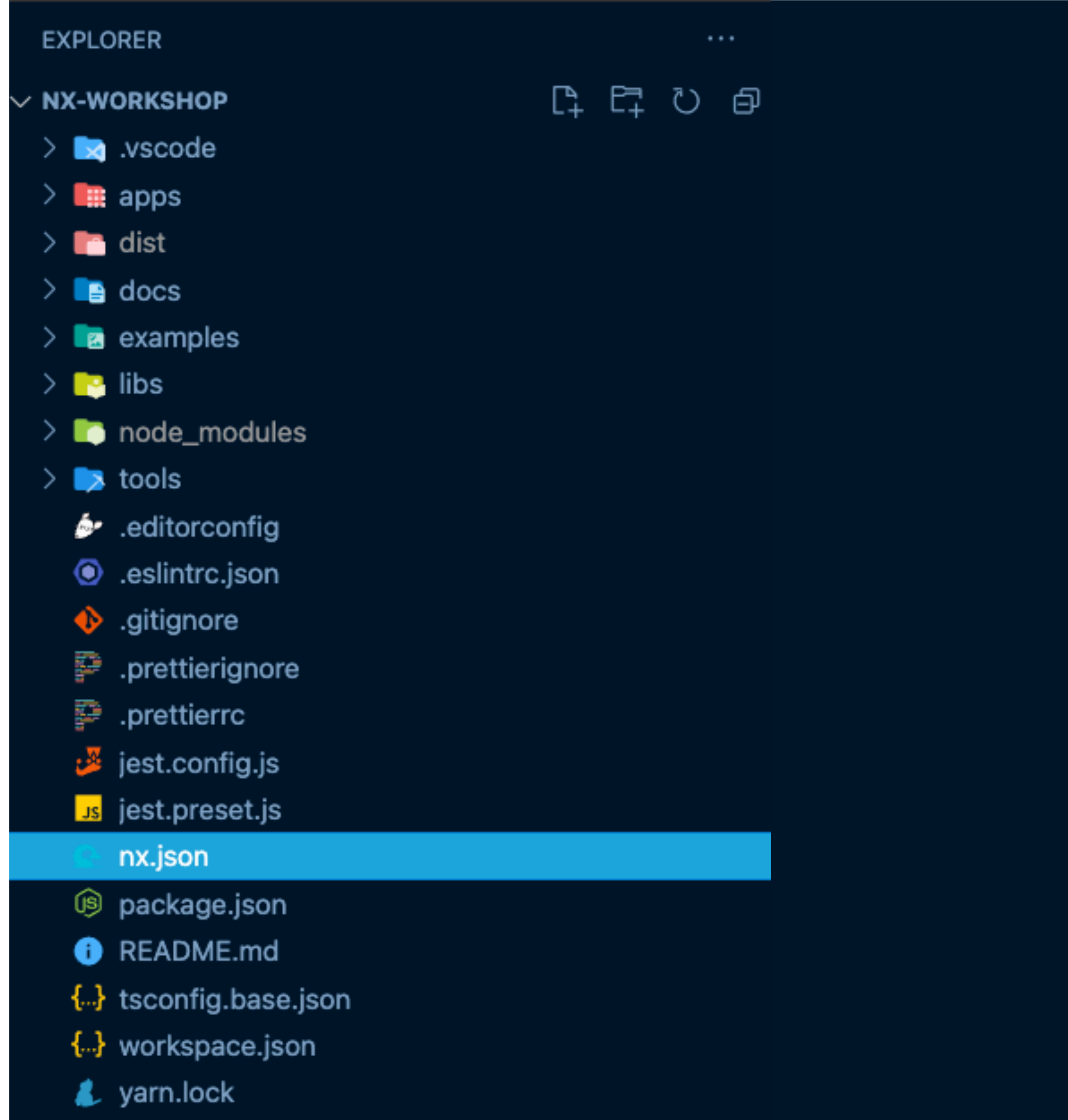
Workspace File Structure



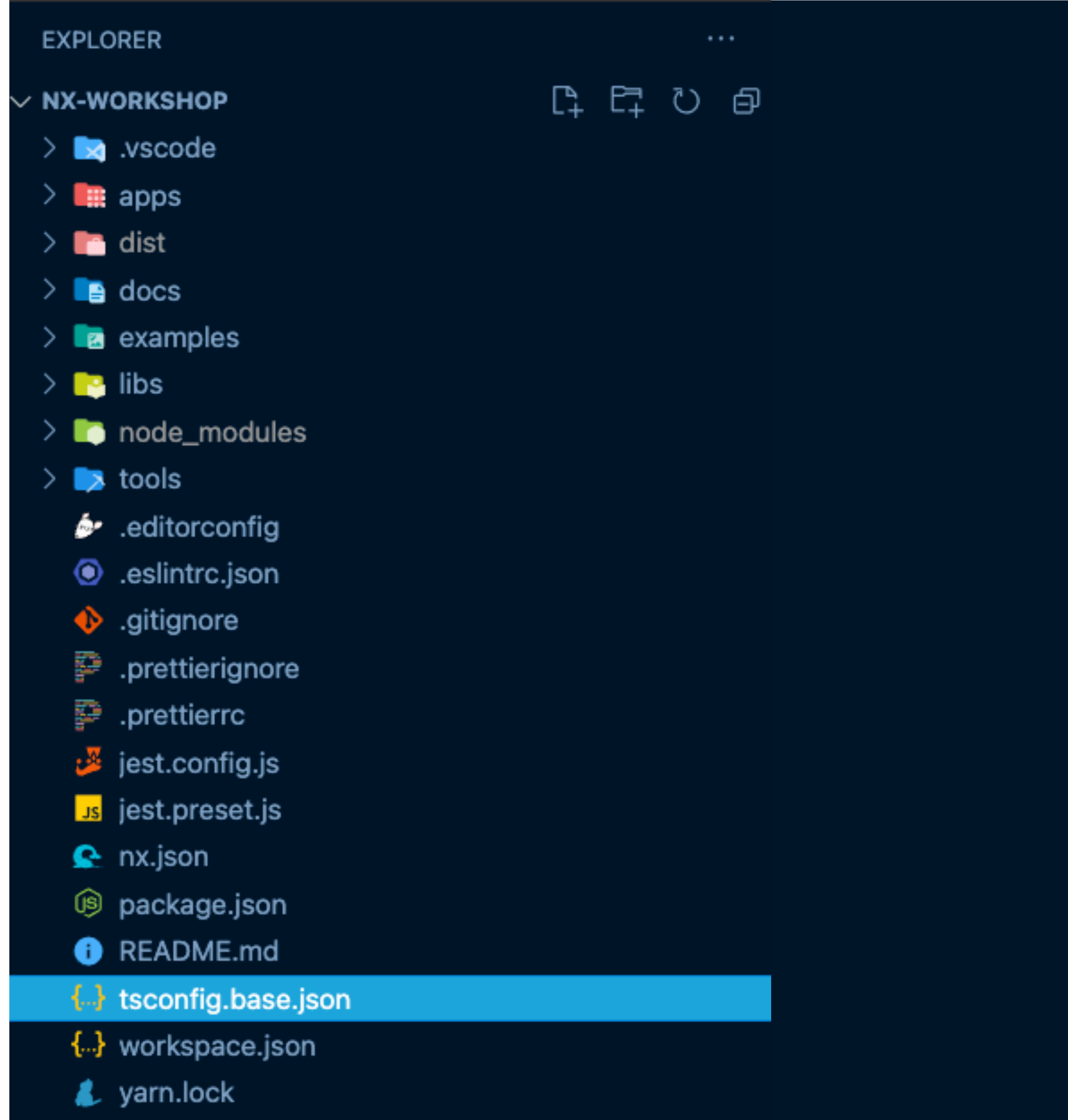
Workspace File Structure



Workspace File Structure

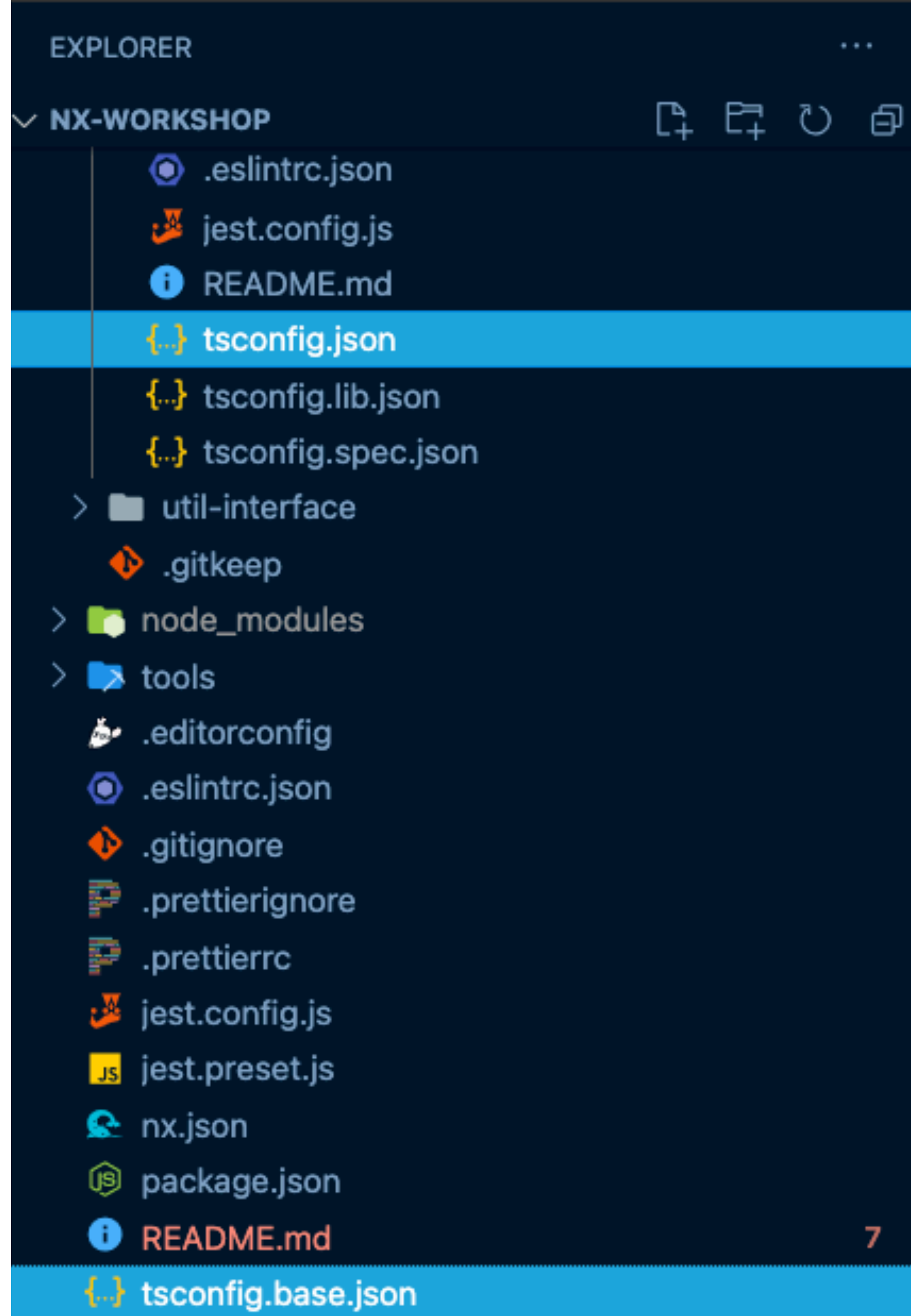


Workspace File Structure



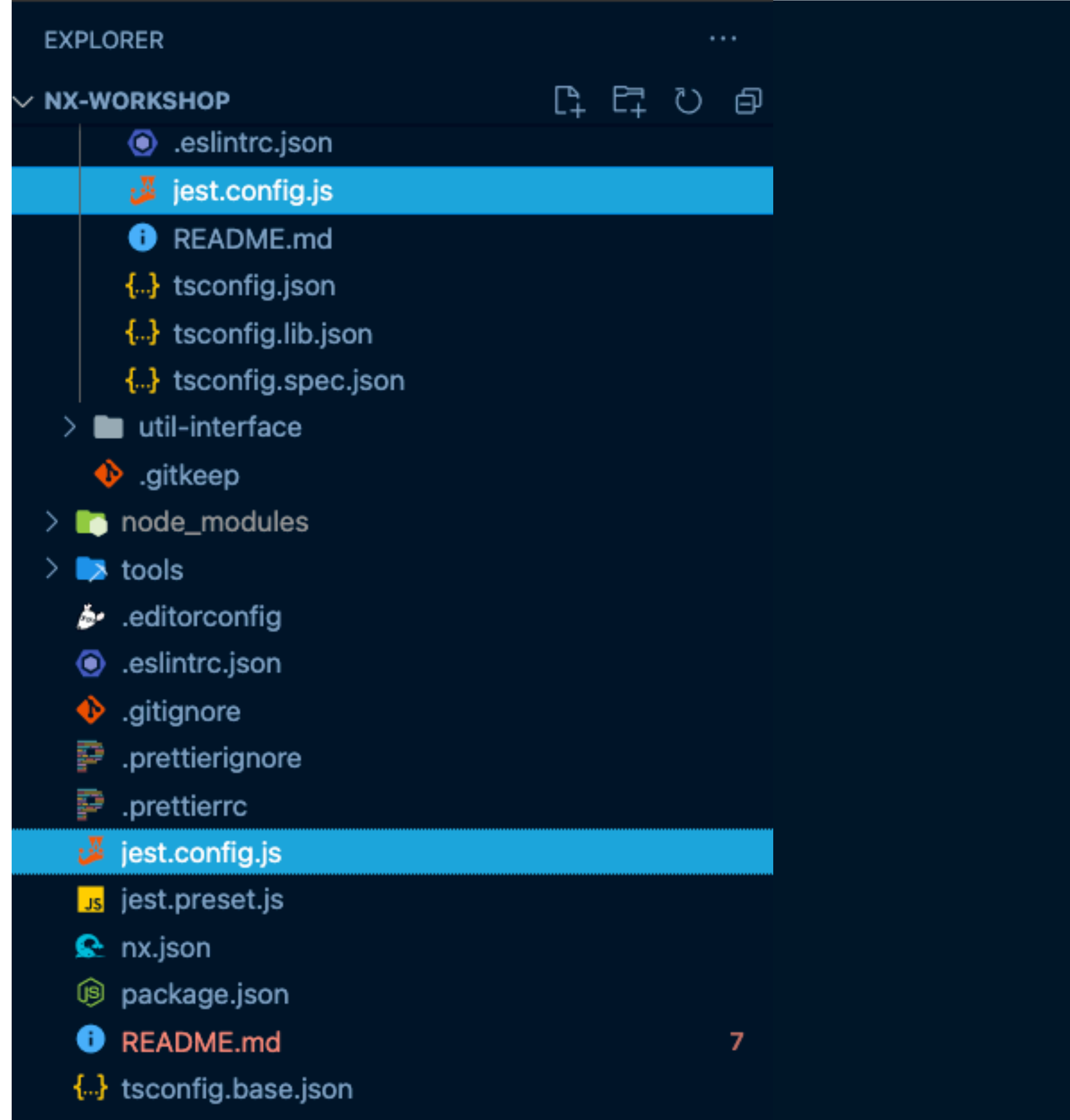
Workspace File Structure

Workspace Config and Project Config



Workspace File Structure

Workspace Config and Project Config



Create a New Workspace

- `npx create-nx-workspace [workspace name]`
- Workspace name sets three things
 - Directory (/Users/bob/Documents/my-org)
 - Path alias (import {} from '@my-org/some-projects';)
 - npm scope (npm install @my-org/published-library)

Lab 1

Generate an empty workspace

Plugins

```
nx list
```

```
yarn add [plugin]
```

```
Ex: yarn add @nrwl/nest
```

Schematics

- CLI
 - Syntax:

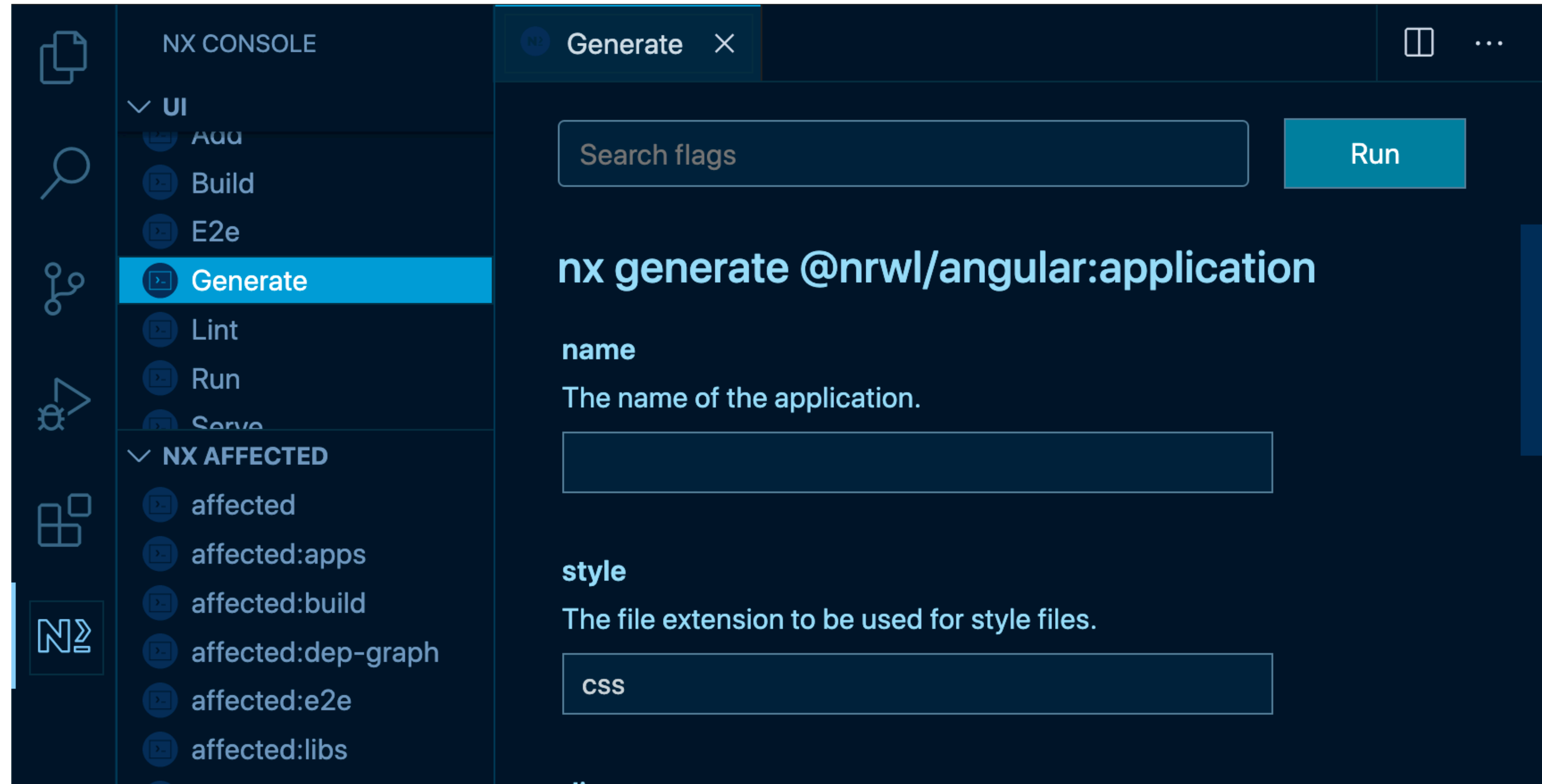
```
nx generate [plugin]:[generator] [options]
```

- Example:

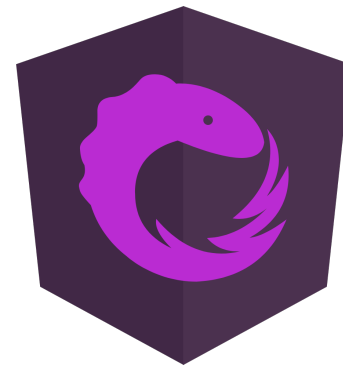
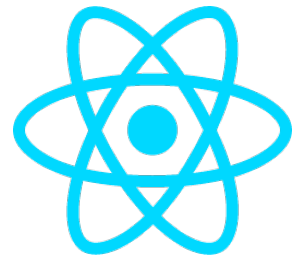
```
nx g @nrwl/angular:app my-app
```

Schematics

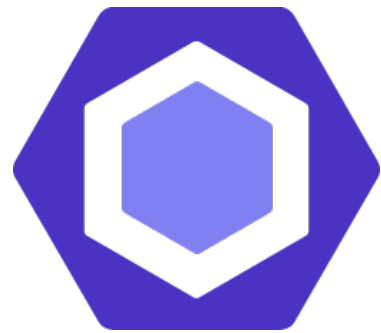
- Nx Console



Code Generation for...



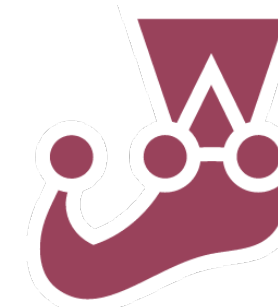
Angular, React, NgRx, Storybook,...



TSLint, ESLint, Prettier



NestJS, NextJS, Node



Protractor, Jest, Cypress



```
nx generate @nrwl/workspace:workspace-generator my-generator
```

Nx Workspace Generators

- Create custom generators
- Optimized for your business
- Increase Dev Velocity
- Guarantee compliance

Lab 2

Generate an Angular app

Executors

- Defined in workspace.json

```
workspace.json ×
workspace.json > {} projects > {} review > {} architect
Isaac Mann, 4 months ago | 1 author (Isaac Mann)
1 {
2   "version": 1,
3   "projects": {
4     "review": {
5       "root": "apps/review",
6       "sourceRoot": "apps/review/src",
7       "projectType": "application",
8       "schematics": {},
9       "architect": {
10        > "build": { ...
56        },
57        > "serve": { ...
68        },
69        > "lint": { ...
80        },
81        "test": { Isaac Mann, 6 months ago • initial
82          "builder": "@nrwl/jest:jest",
83          "options": {
84            "jestConfig": "apps/review/jest.config.js",
85            "tsConfig": "apps/review/tsconfig.spec.json"
86          }
87        },
88        "doc": {
89          "builder": "./tools/builders:typedoc",
```

Executors

- CLI

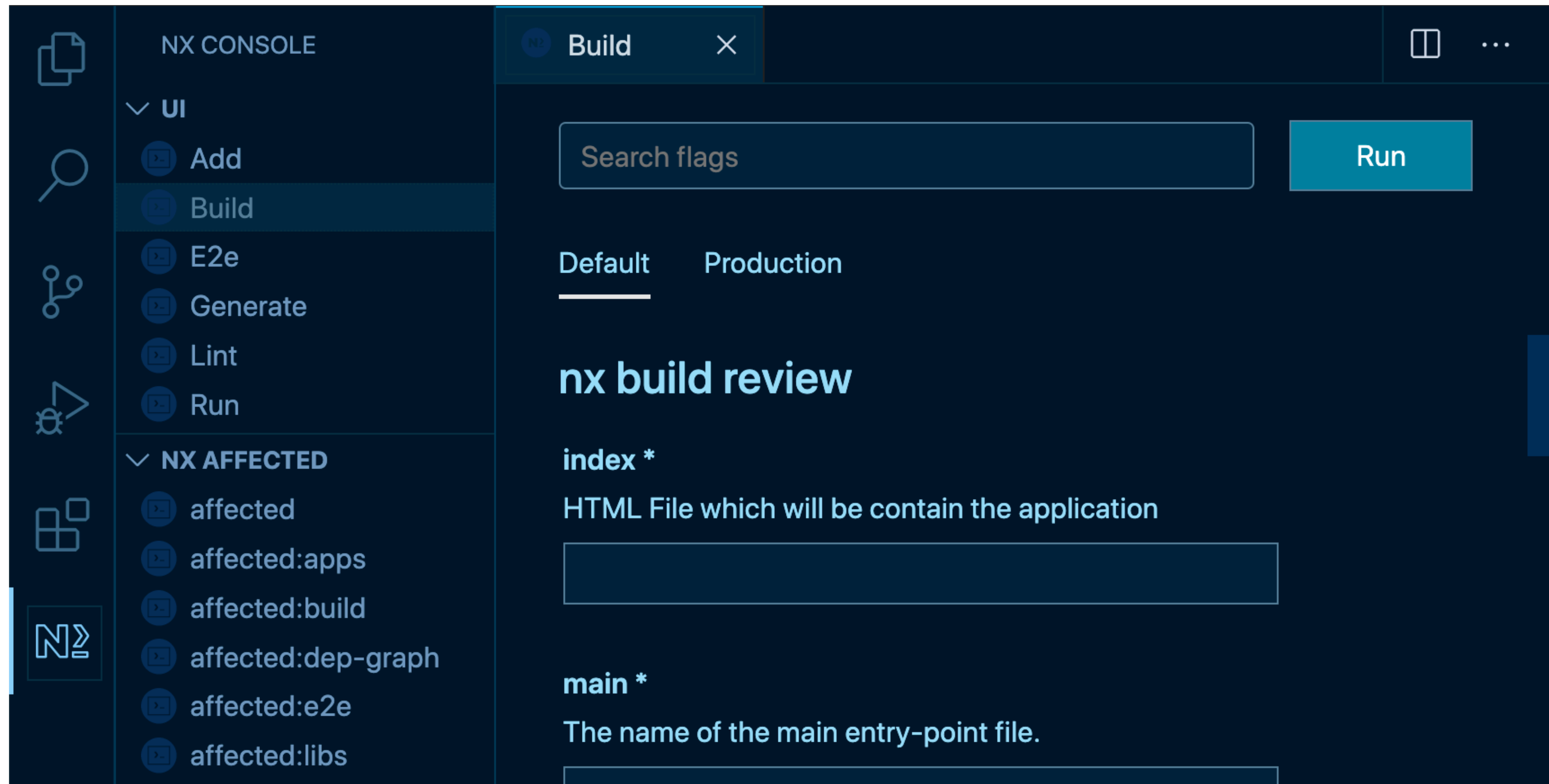
```
nx run [project]:[target] [options]  
Ex: nx run my-app:serve
```

- CLI Shorthand

```
nx [target] [project] [options]  
Ex: nx serve my-app
```

Executors

- Nx Console



Lab 3

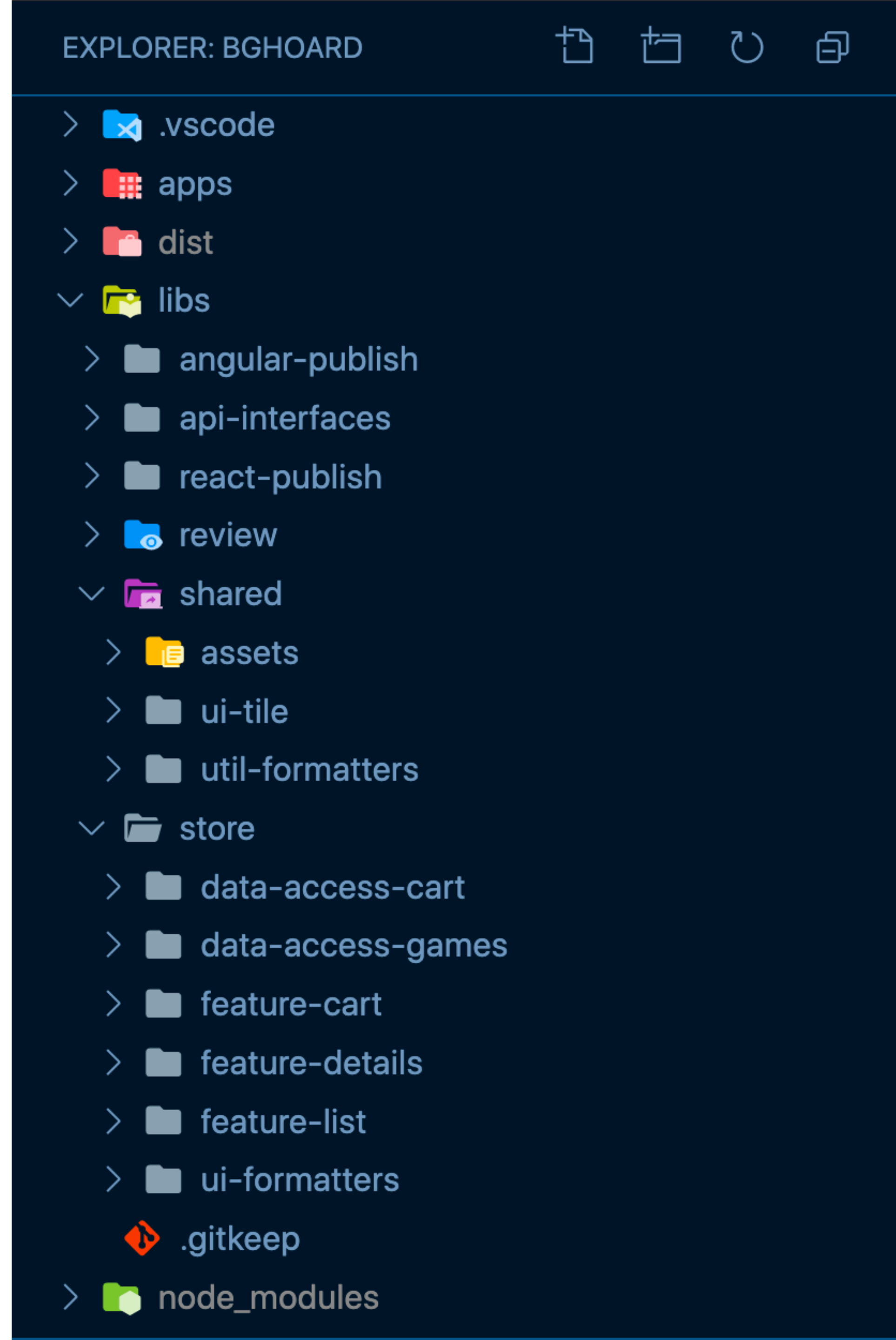
Executors

Libraries

- Feature
Ex: feat-home
- UI
Ex: ui-input-forms
- Data
Ex: data-access-authentication
- Util
Ex: util-validation-fns

Libraries

- Directory structure
- Note: Moving libraries is easy (see Lab 9)



Libraries

- When should I split code into a new library?
- When do I have too many libraries?

Libraries

- Dependency Graph

Focused on cart

Unfocus

Display Options

Select
Affected

Select All

☐ group by folder

app projects

apps

☒ products

☒ cart

e2e projects

e2e

☒ products-e2e

☒ cart-e2e

lib projects

cart

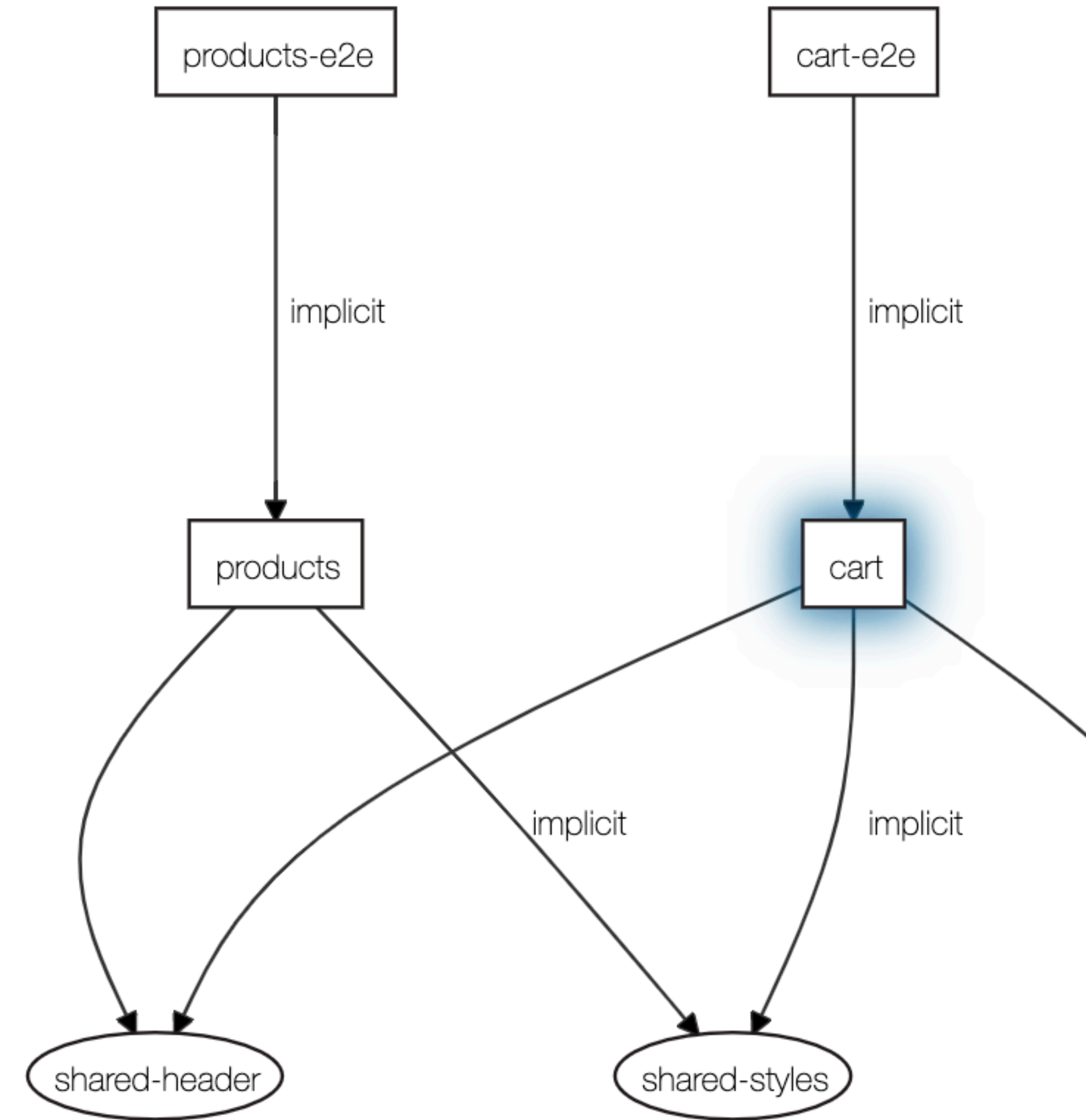
☒ cart-cart-page

products

☐ products-product-detail-page

☐ products-home-page

shared



Lab 4

Generate a Component Library

Lab 5

Generate a Utility Library

Lab 6

Generate a Route Library

Lab 7

Add a NestJS API

Lab 8

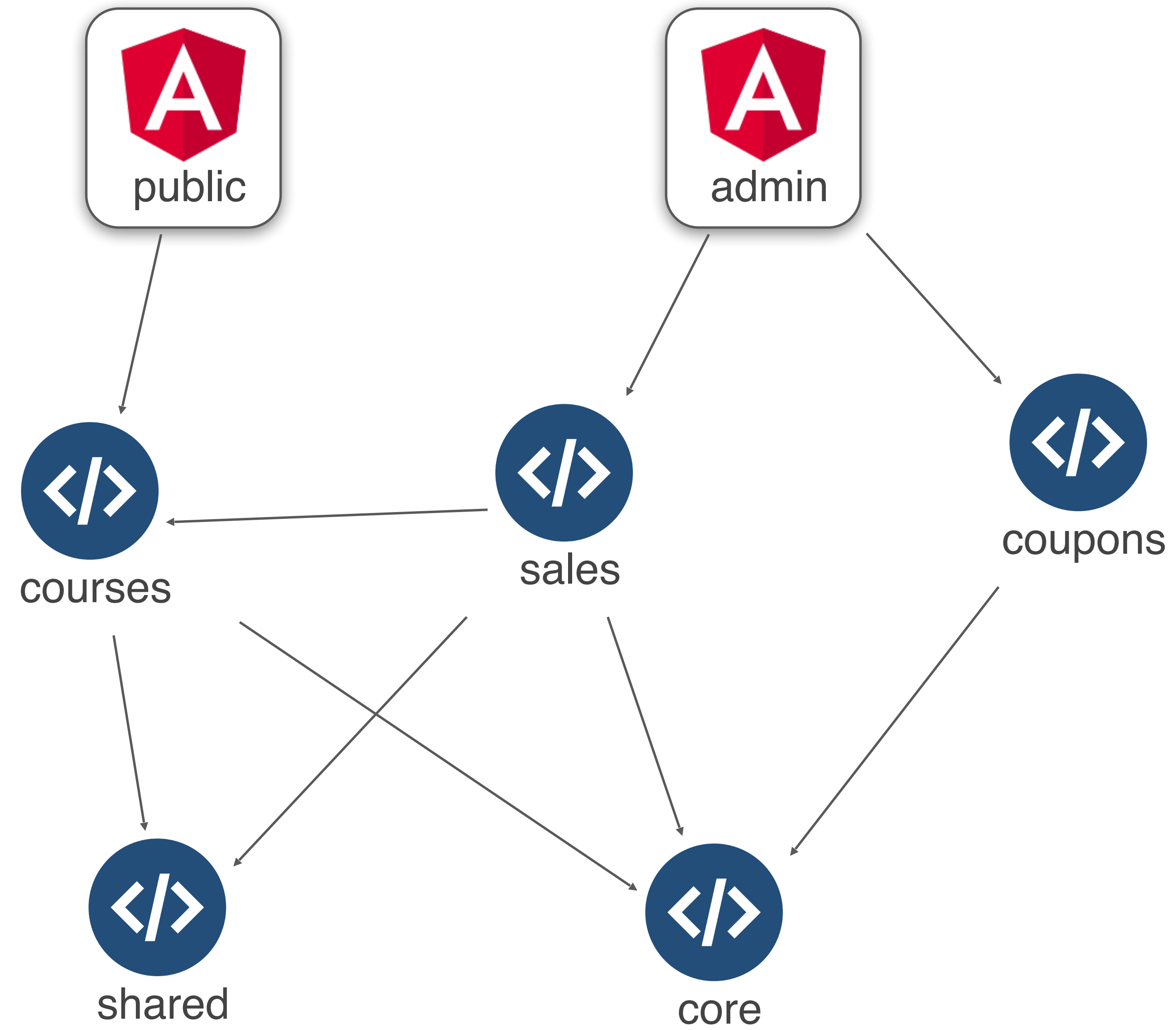
Displaying a Full Game in the Routed game-detail Component

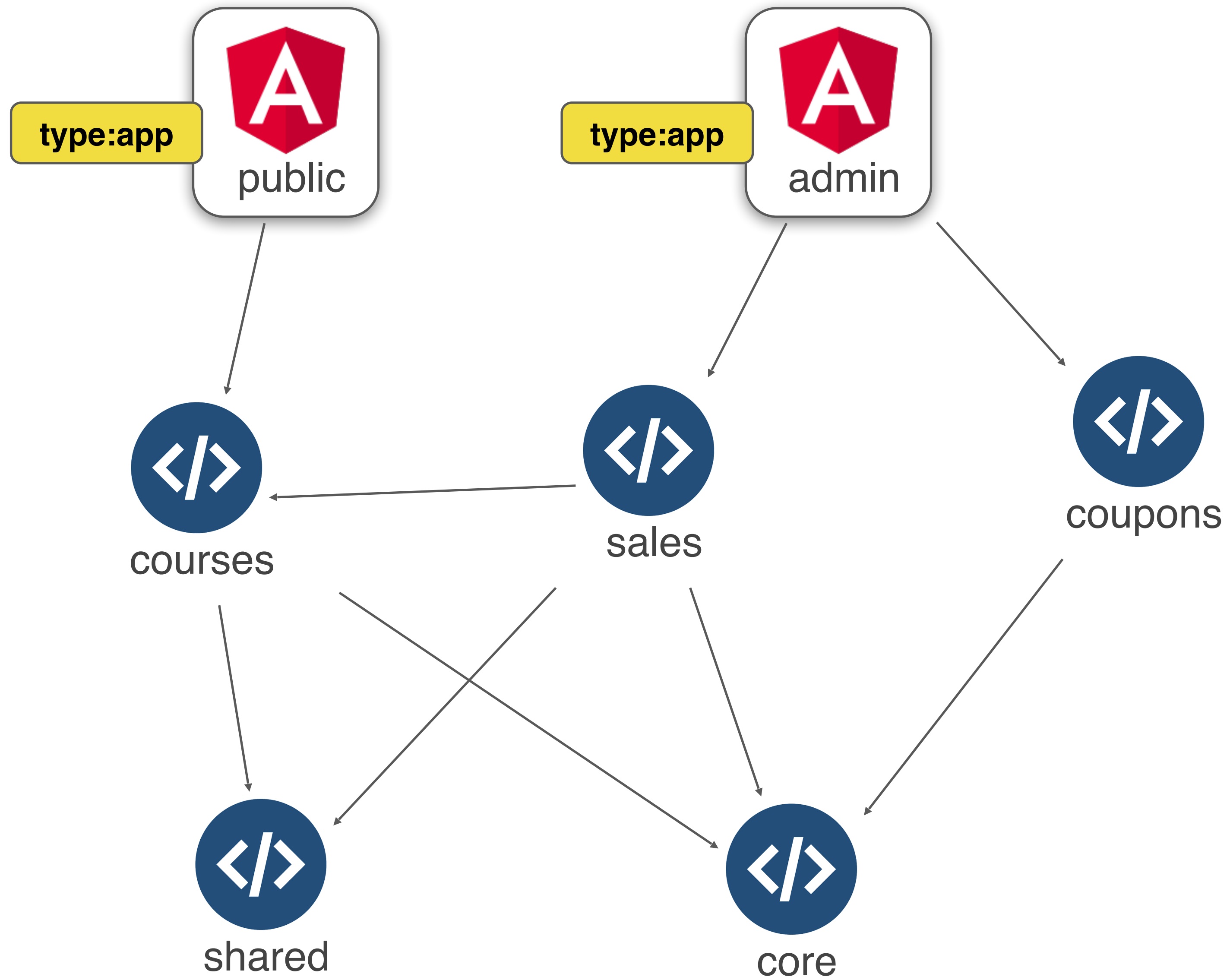
Lab 9

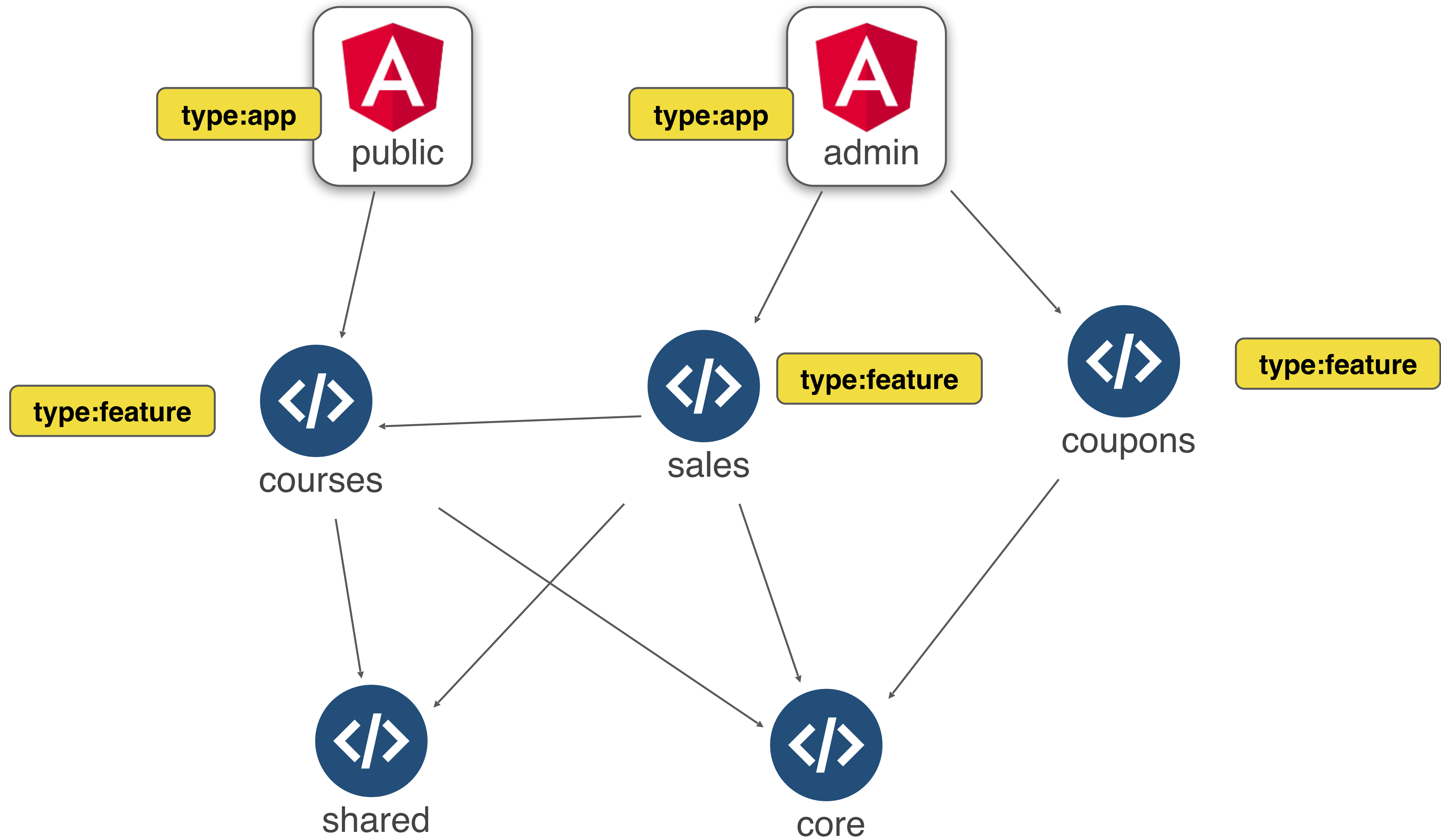
Generate a Type Library that the API and Frontend Can Share

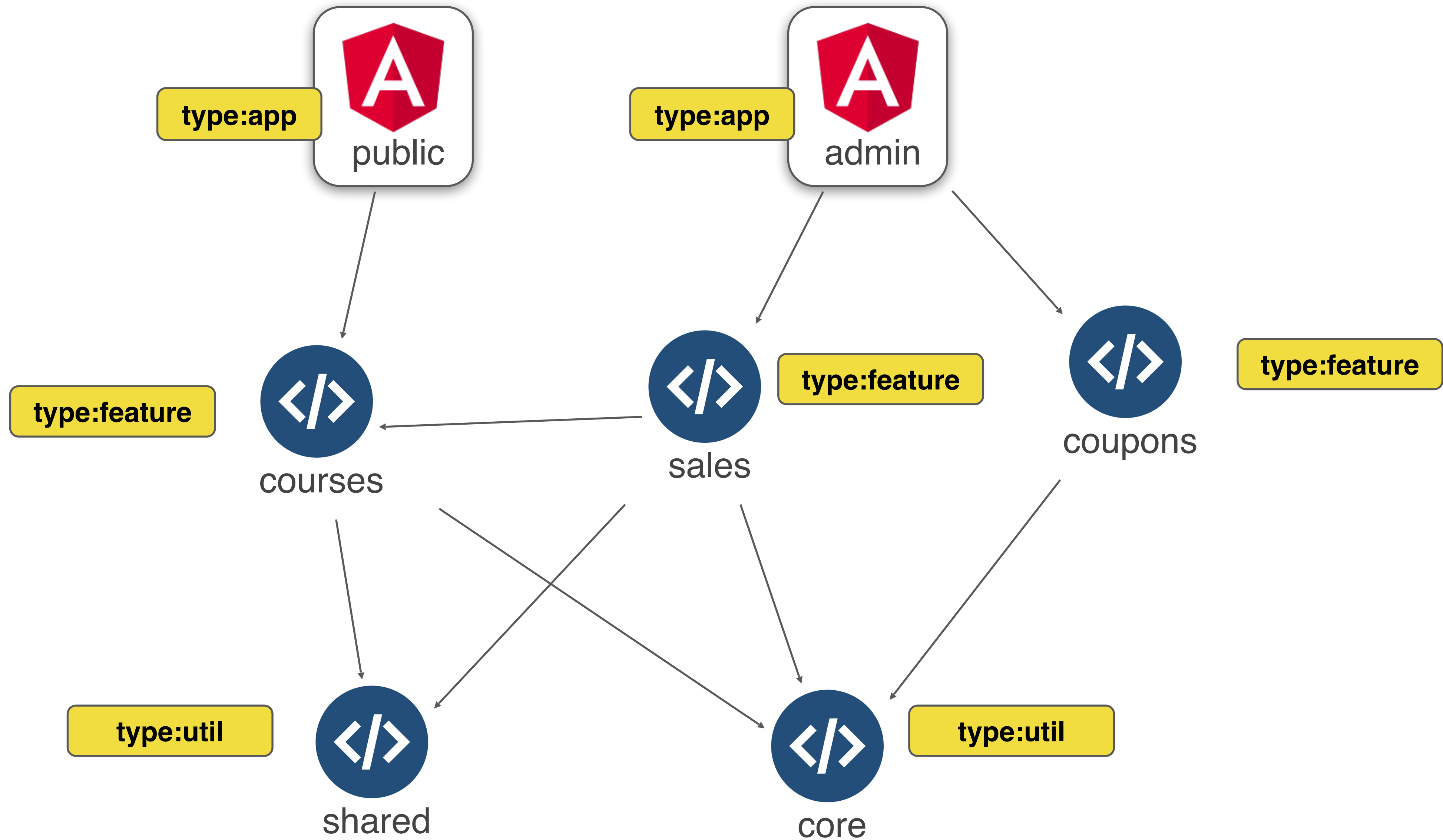
Poll

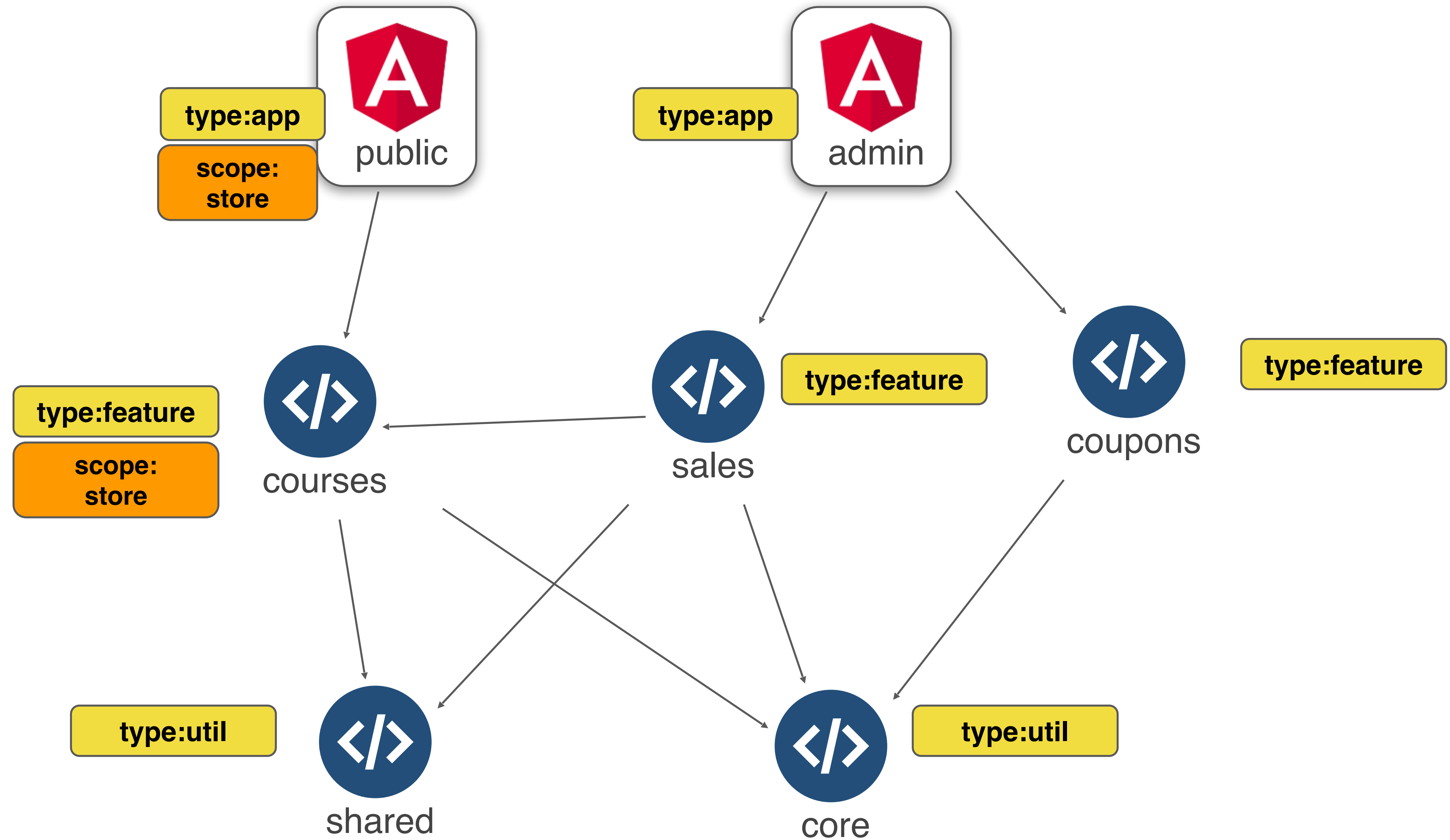
Day 2

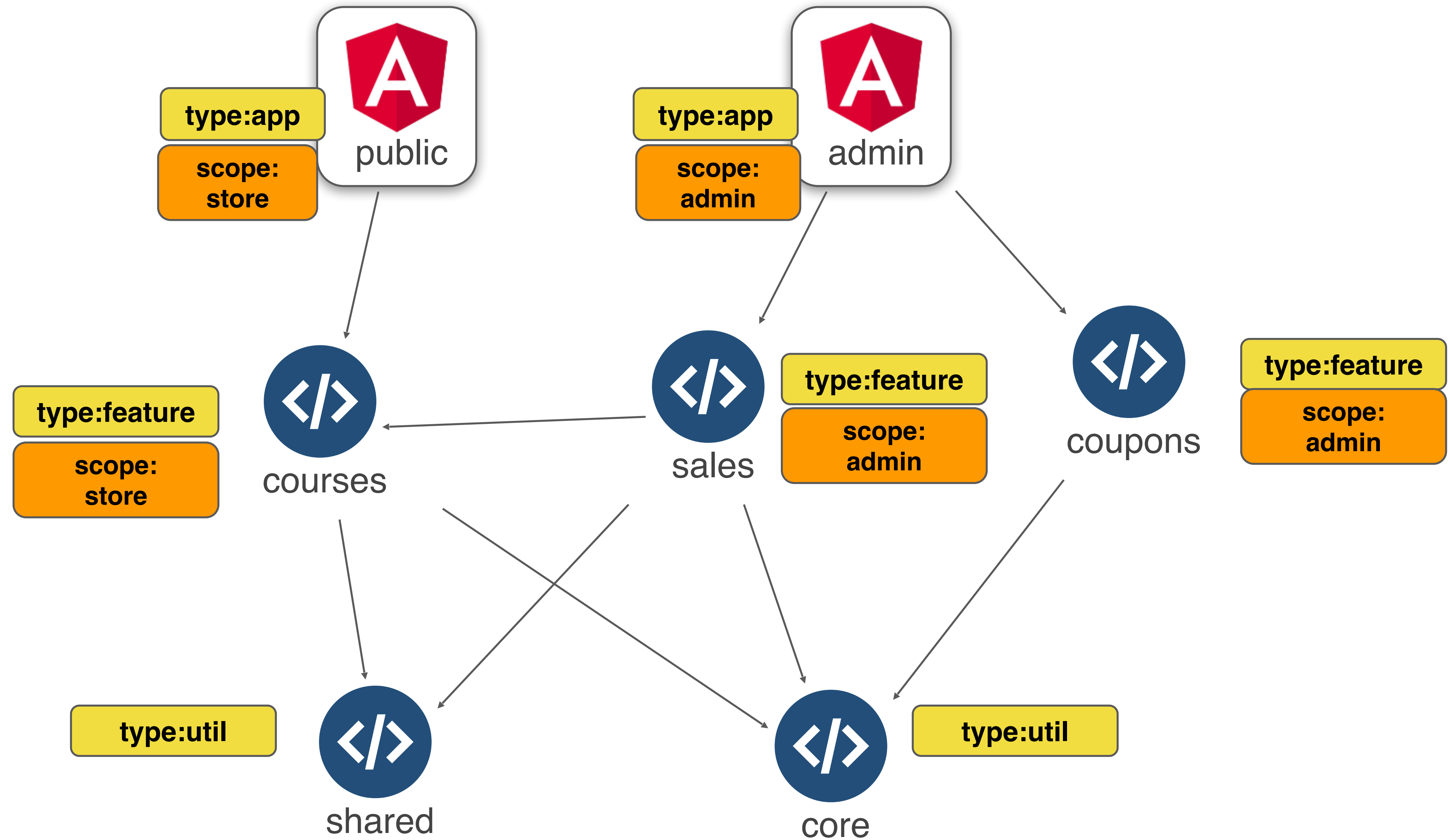


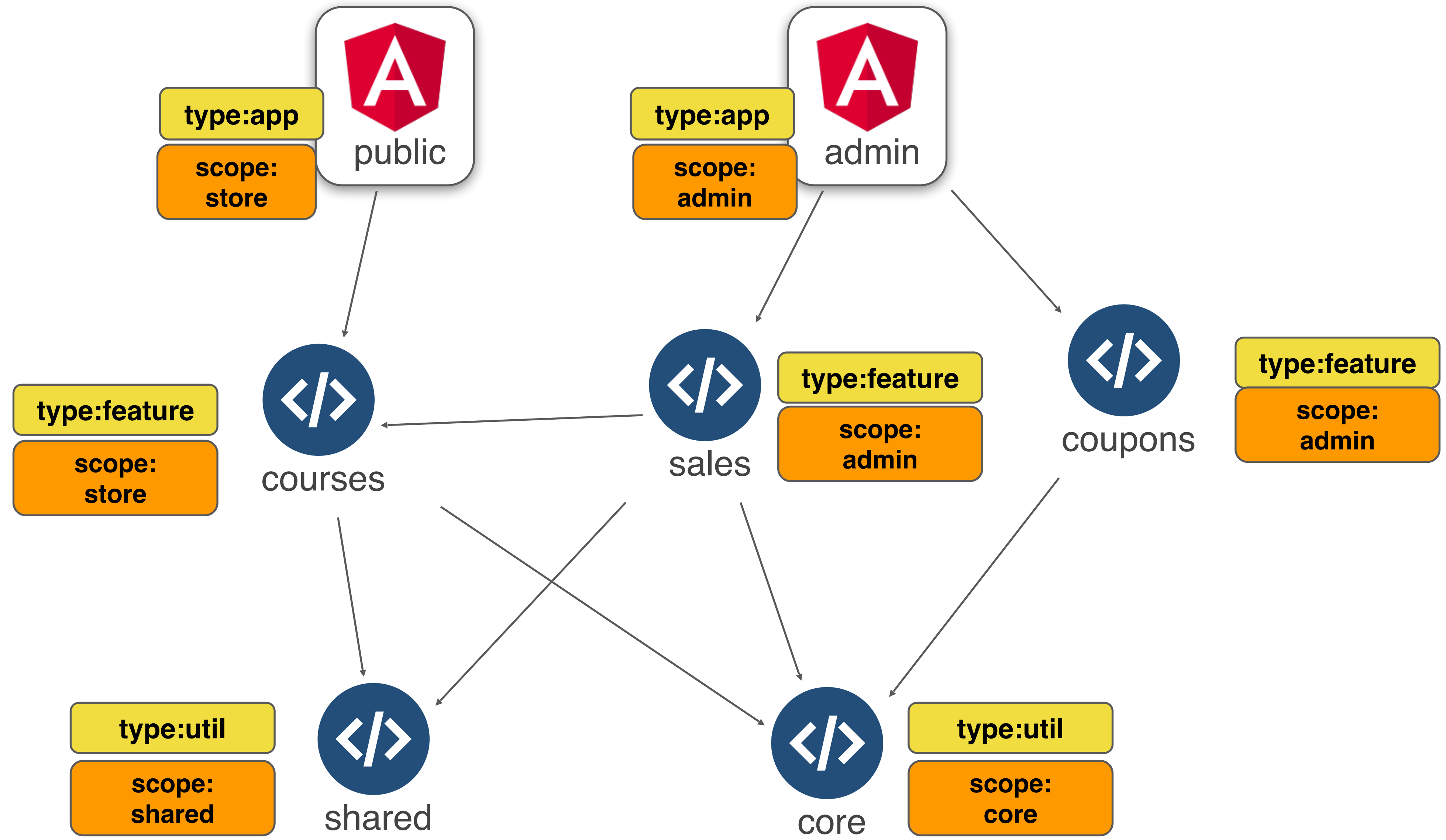








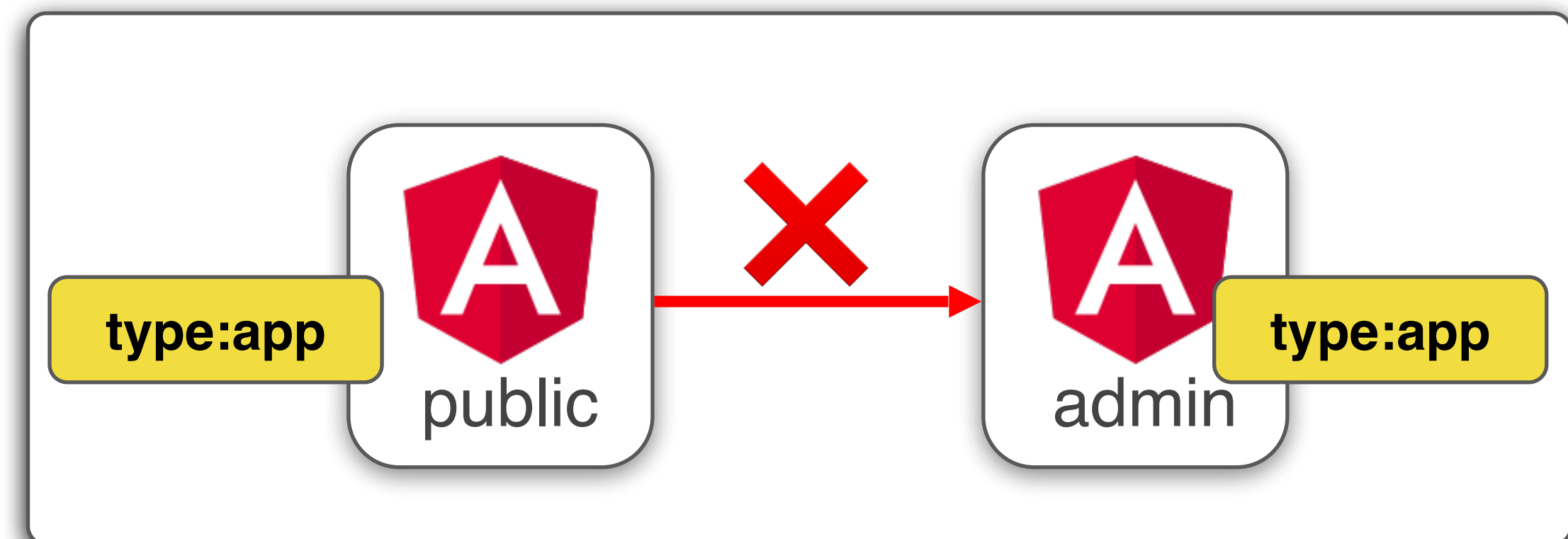
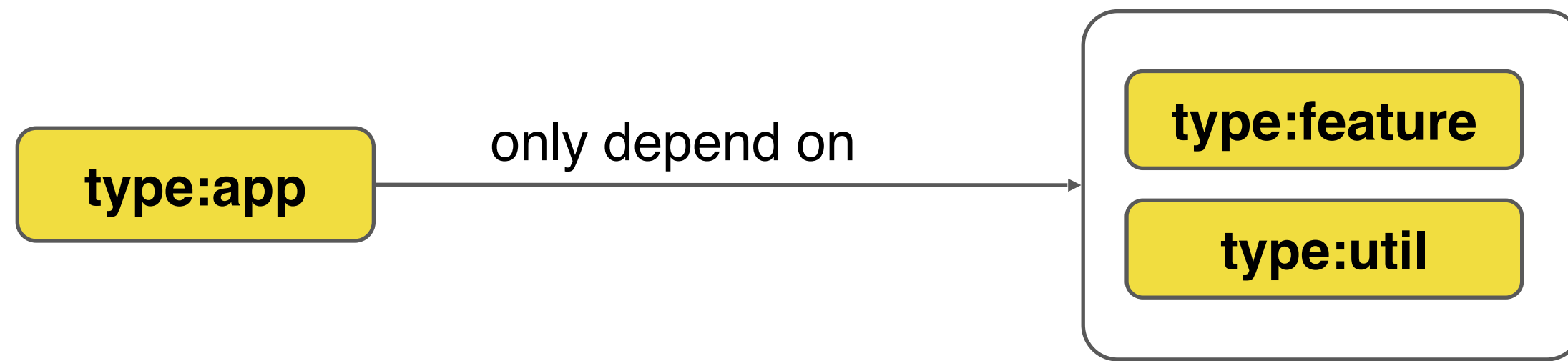




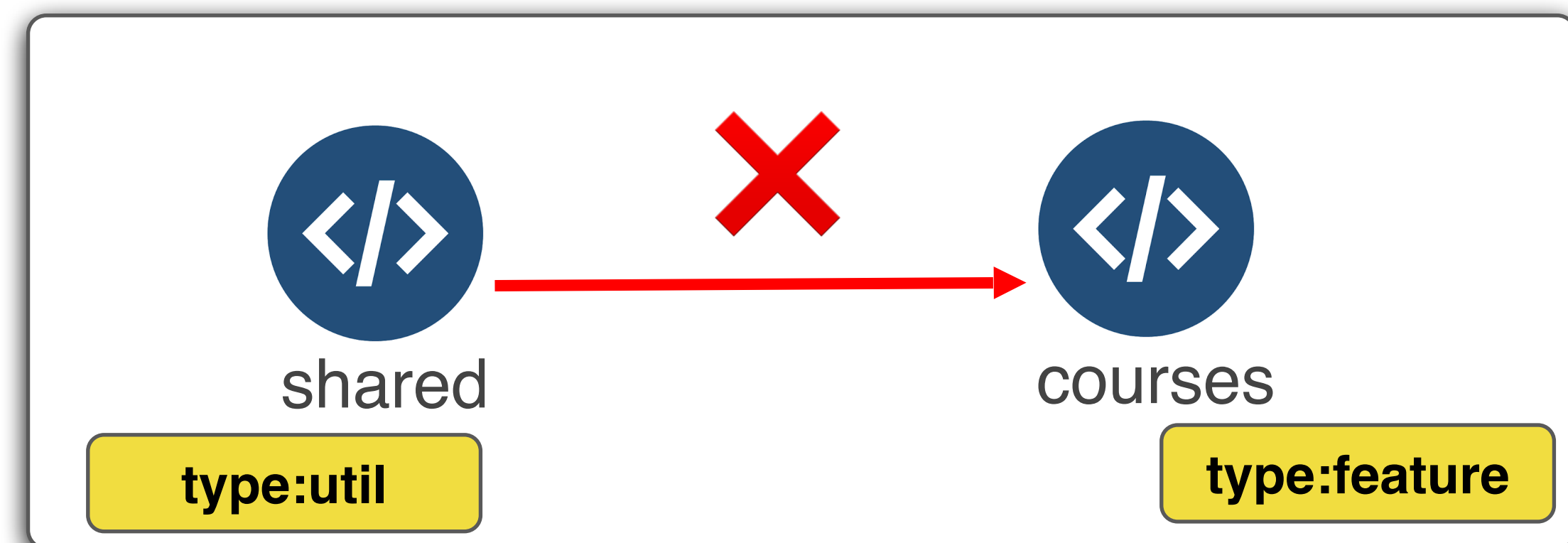
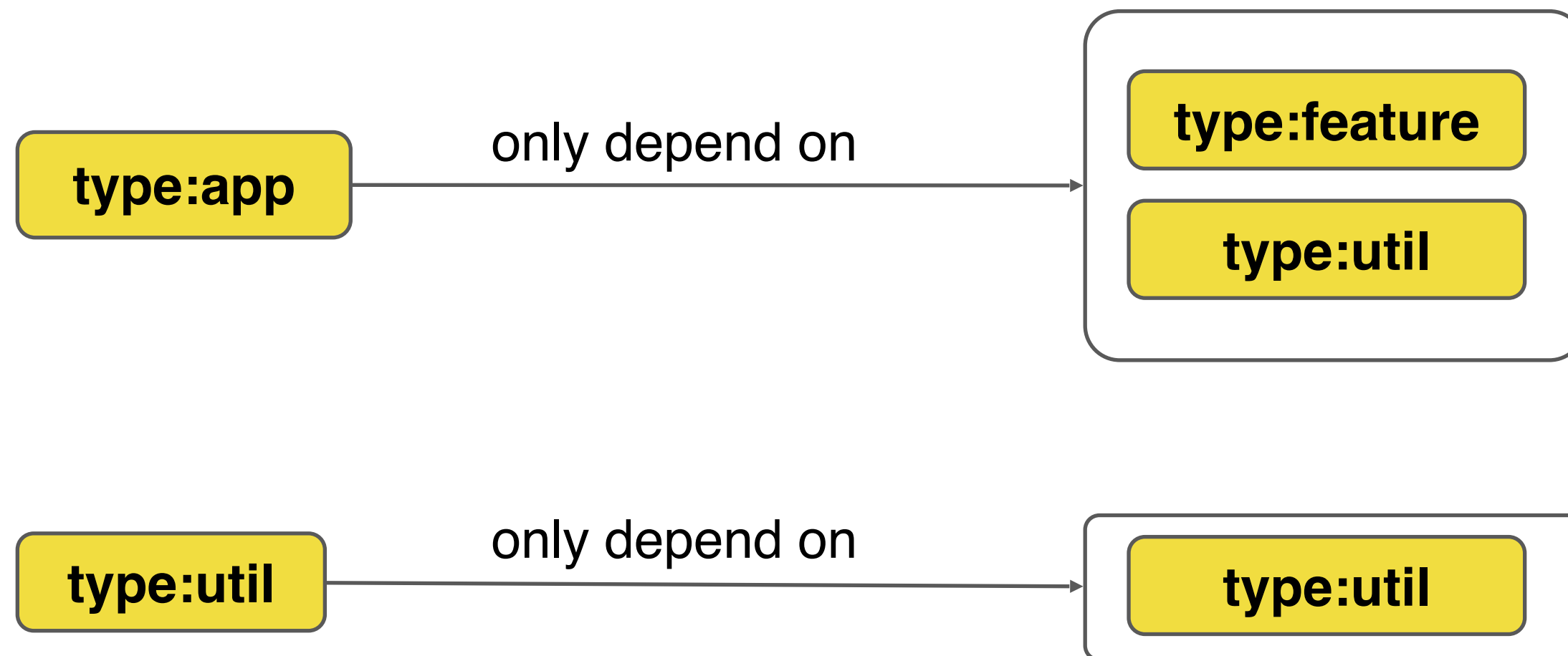


Defining Rules

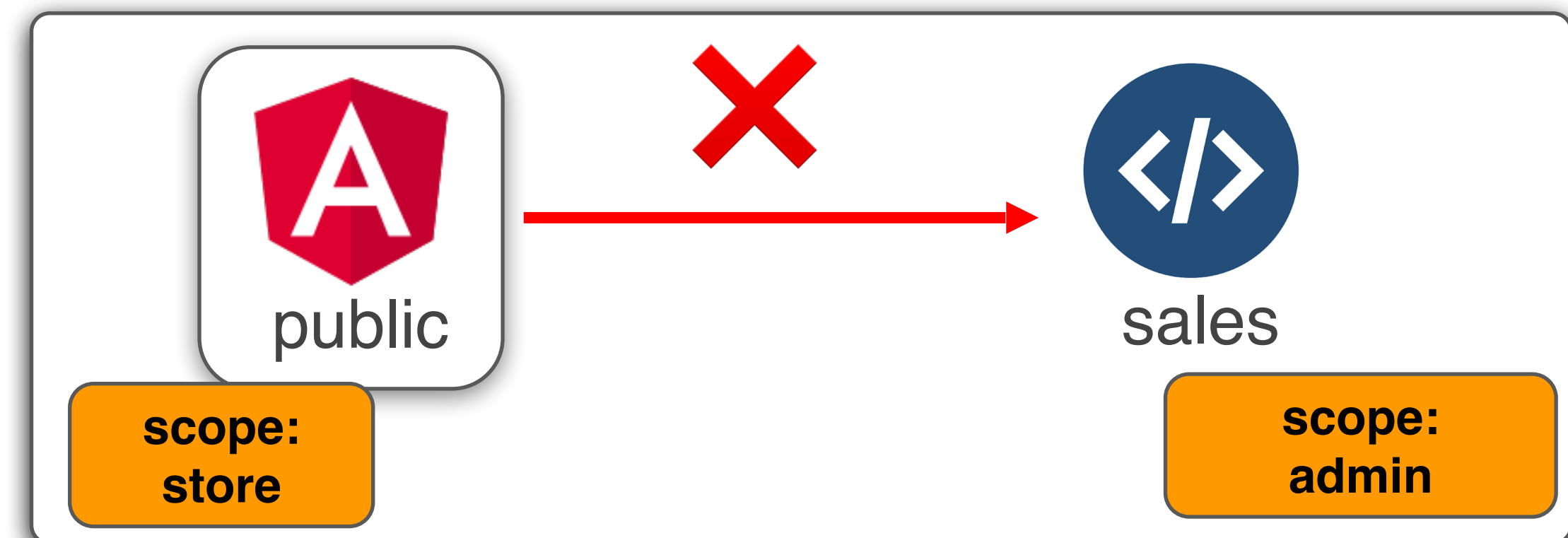
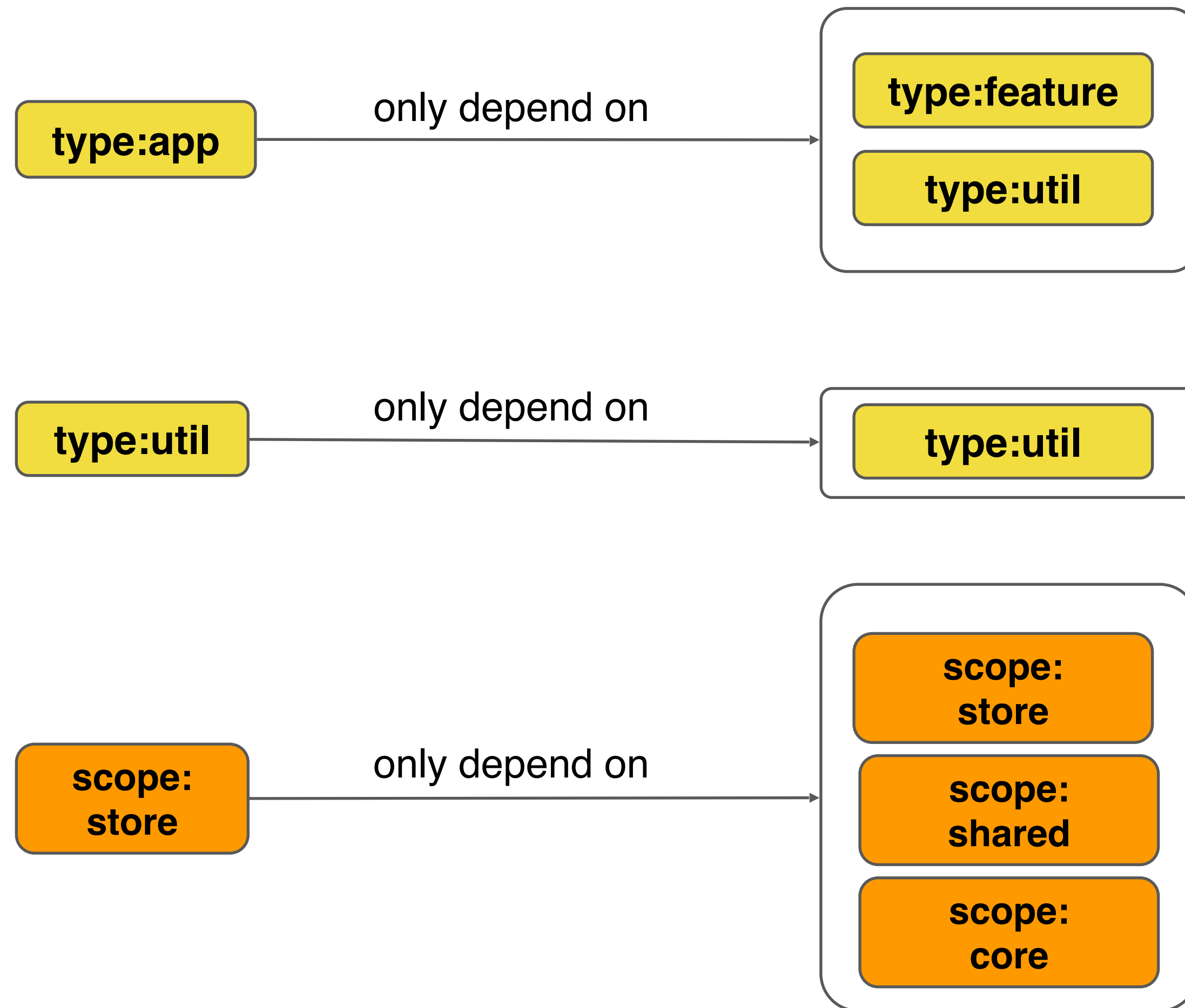
Restricting dependencies



Restricting dependencies



Restricting dependencies



Lab 12

Enforce Library Boundaries with Tags

Workspace Generators

Demo

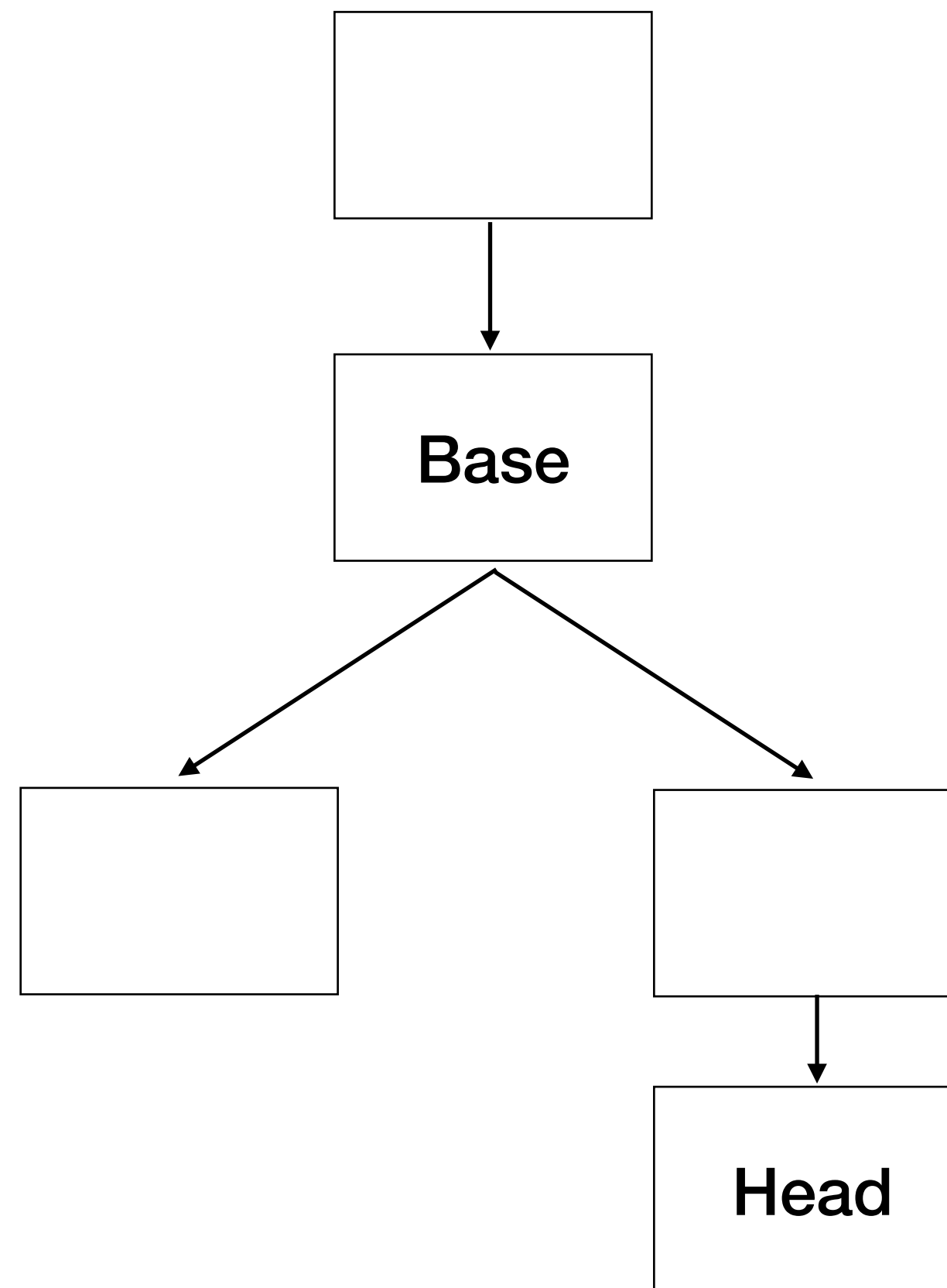
Lab 13

Create Workspace Generators

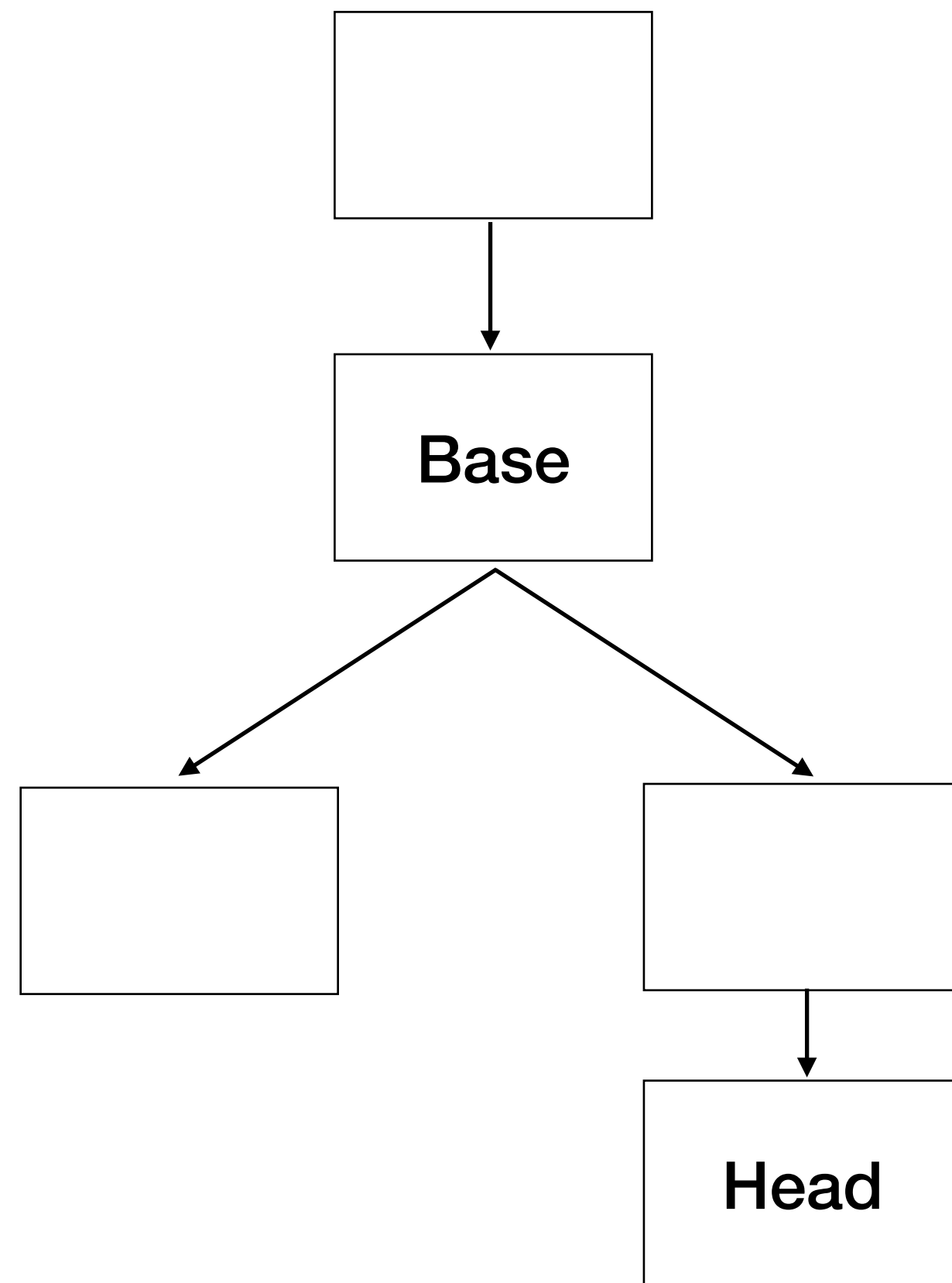
Lab 14

Modifying source code with workspace schematics

Commits



Changed File List






git diff →

 index.ts

 button.component.html

 helpers.ts

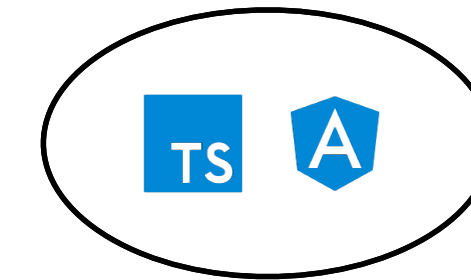
Changed Projects

 index.ts
 button.component.html
 helpers.ts

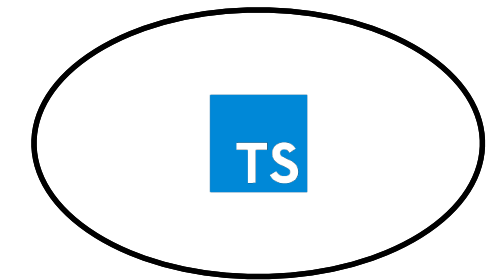
Find Projects



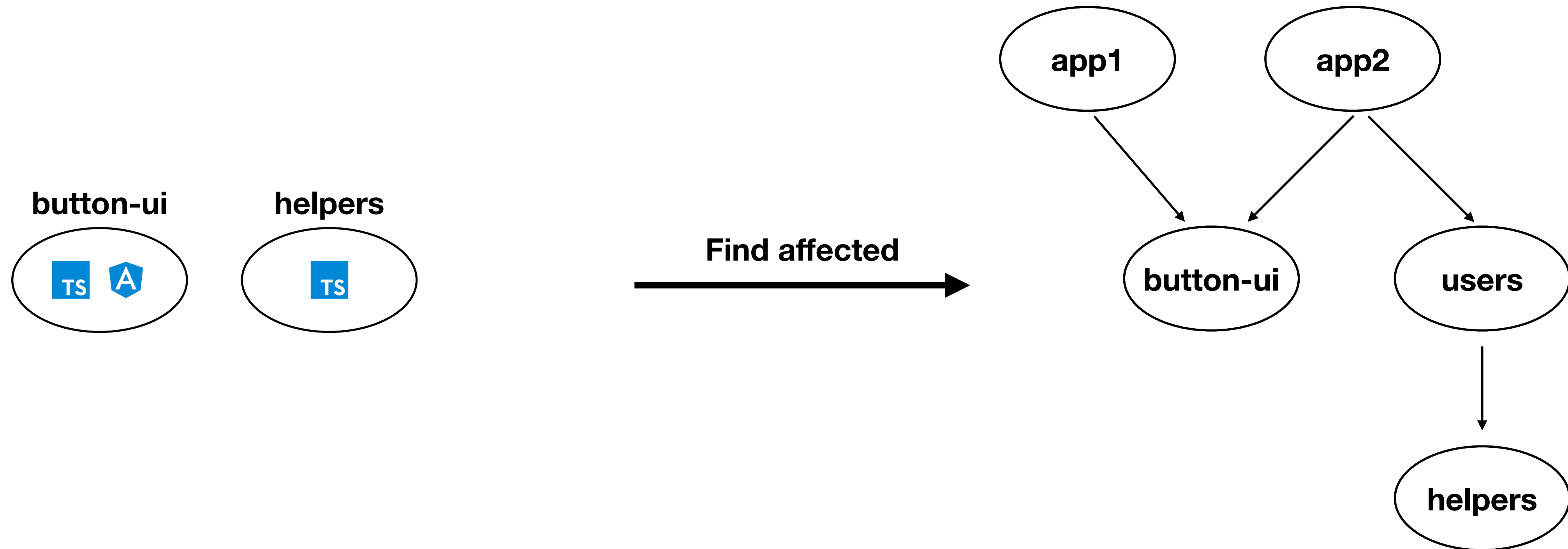
button-ui



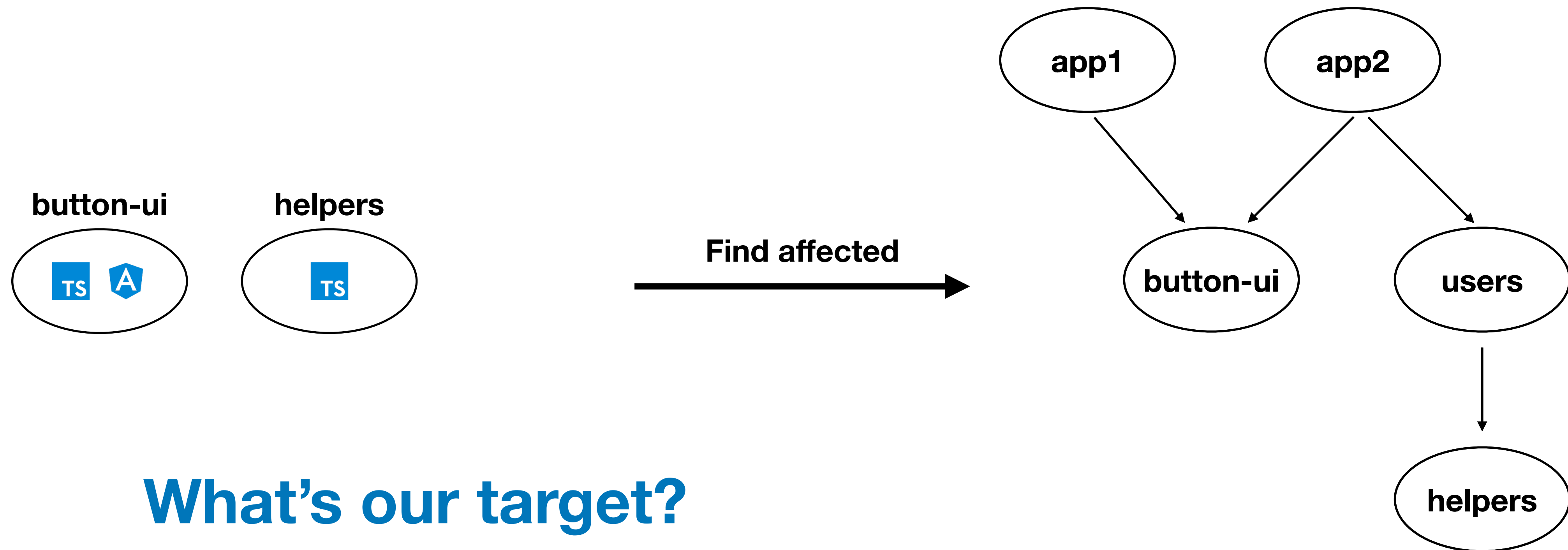
helpers



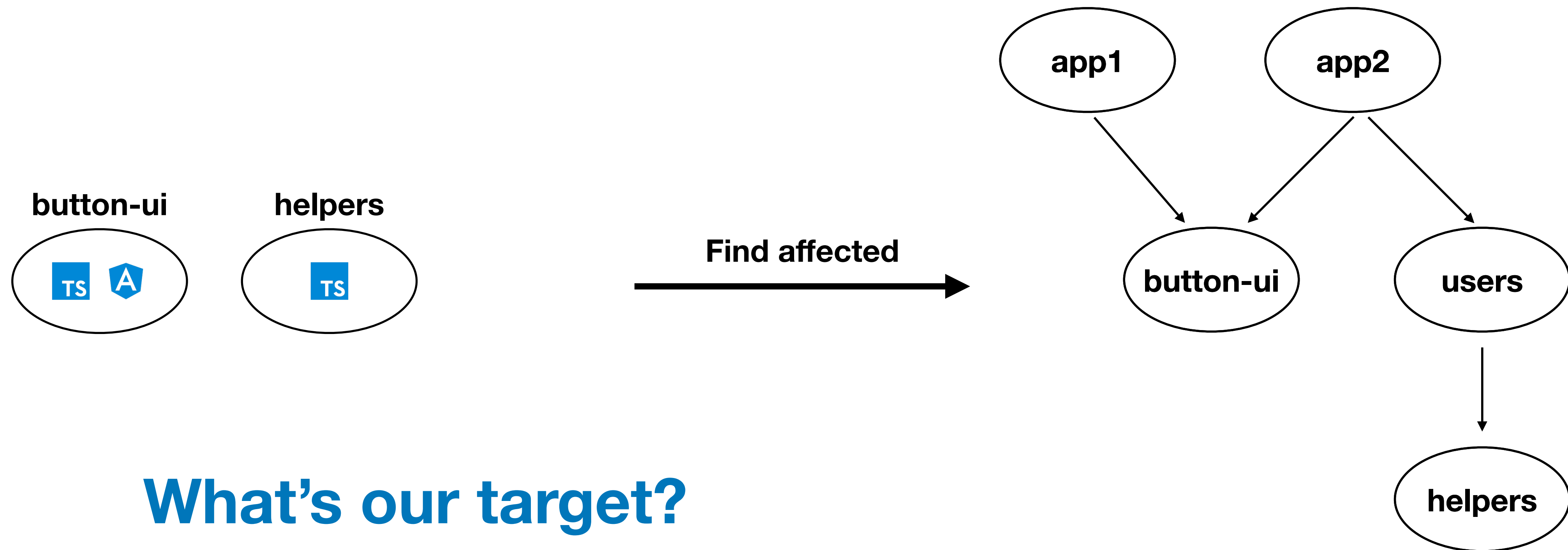
Affected Projects



Affected Projects



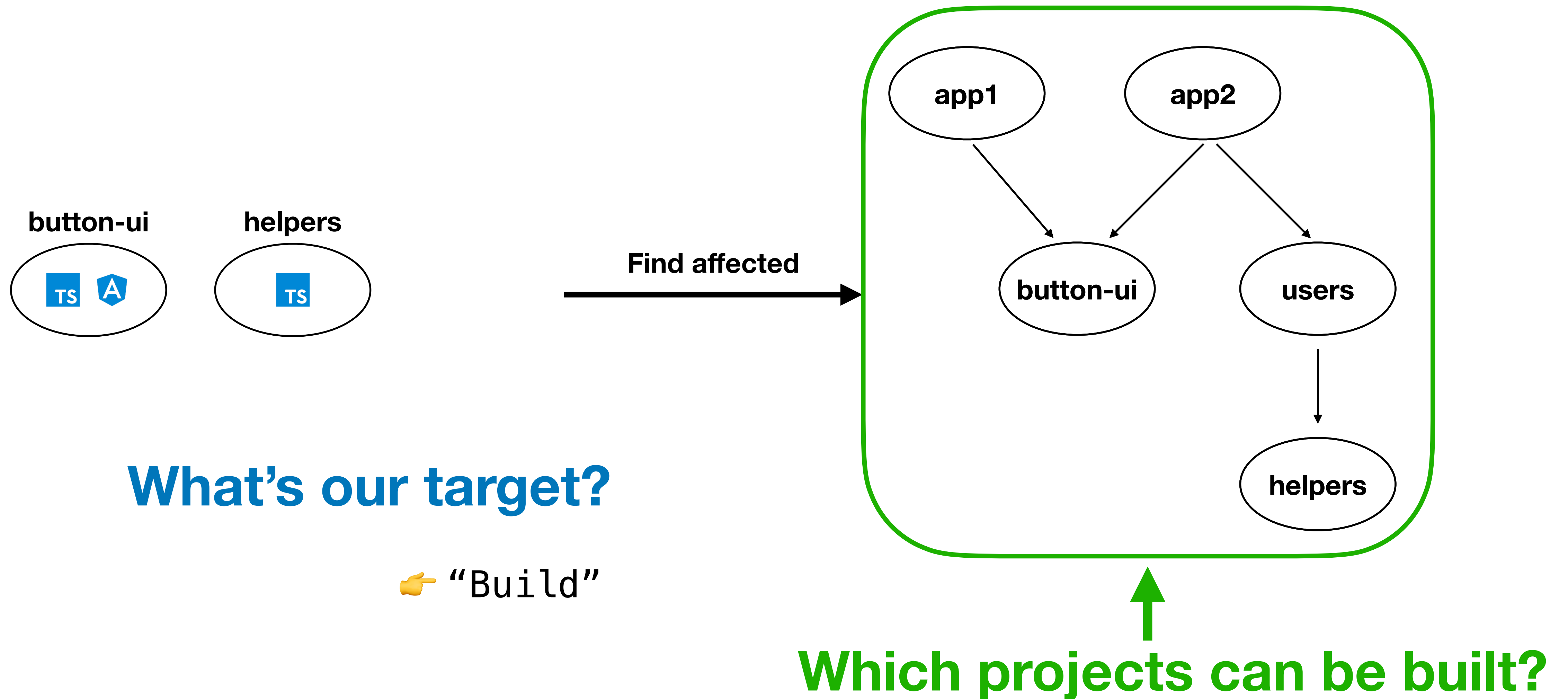
Affected Projects



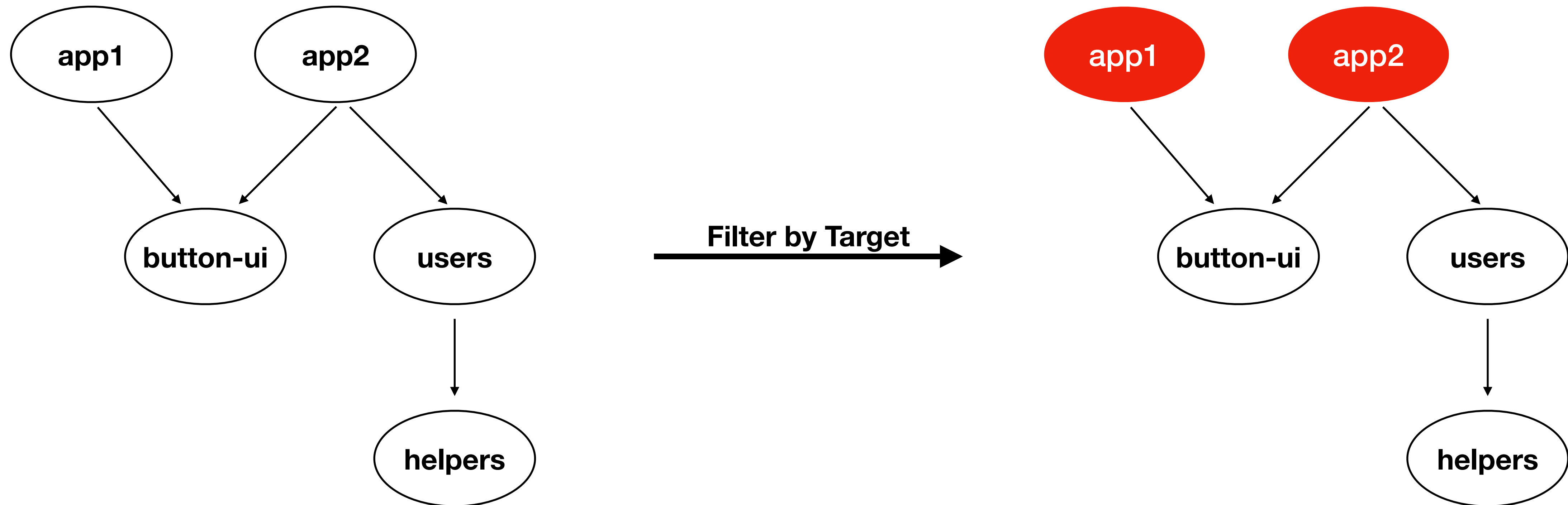
What's our target?

👉 "Build"

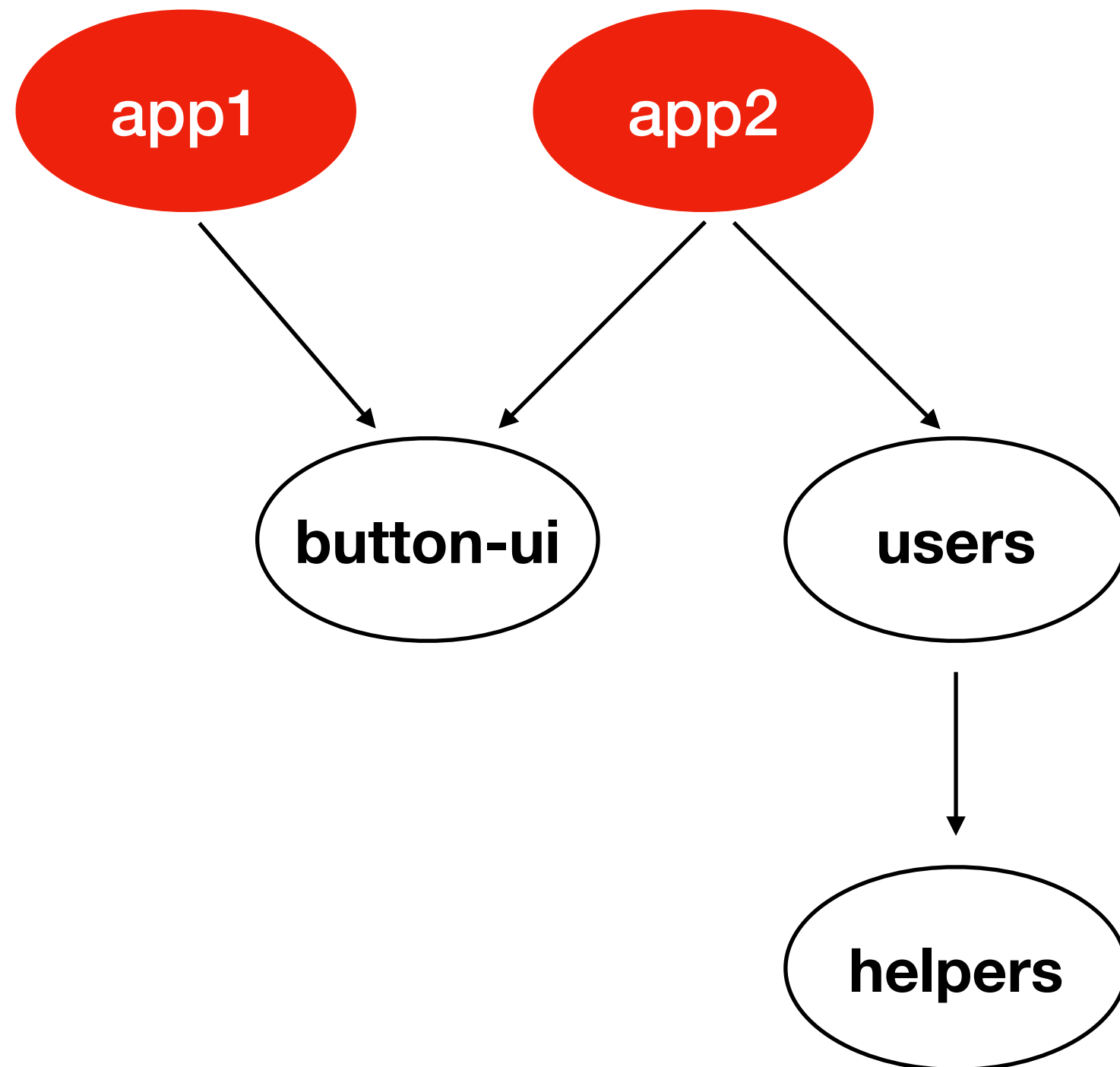
Affected Projects



Affected Projects with Target



CLI Commands



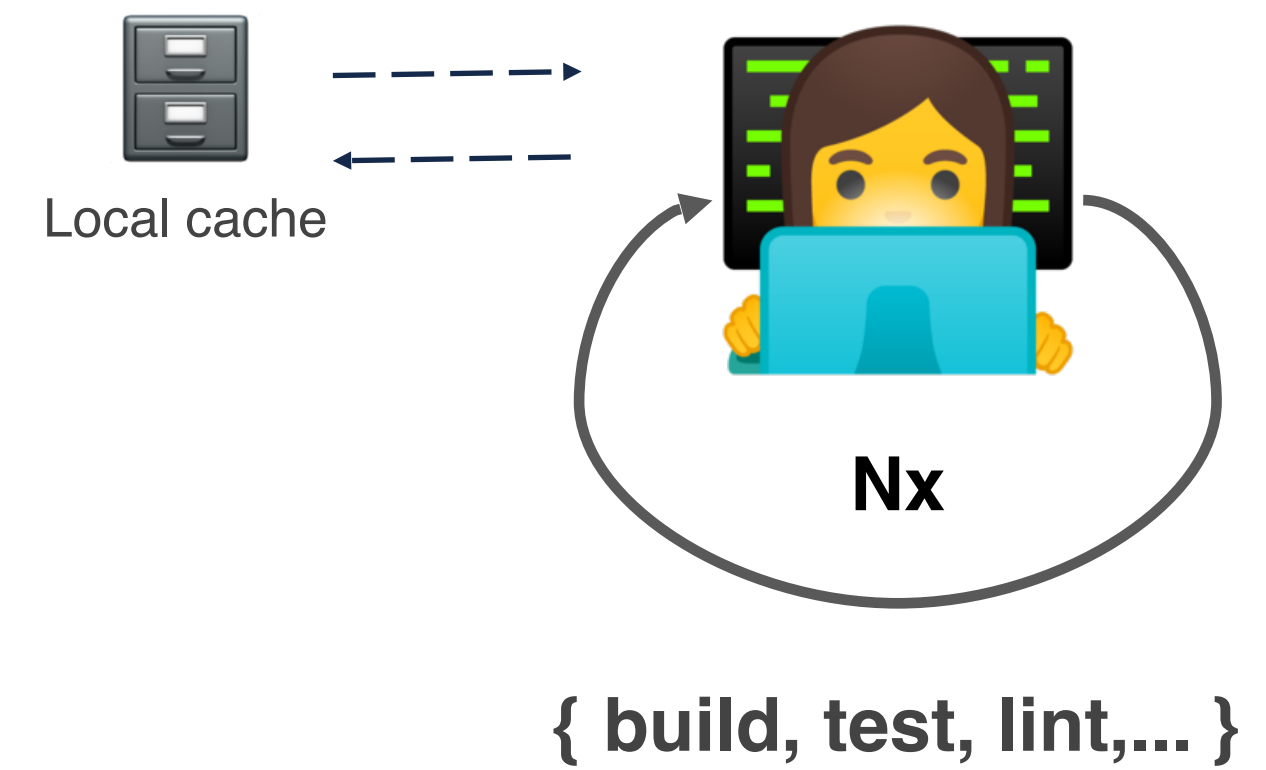
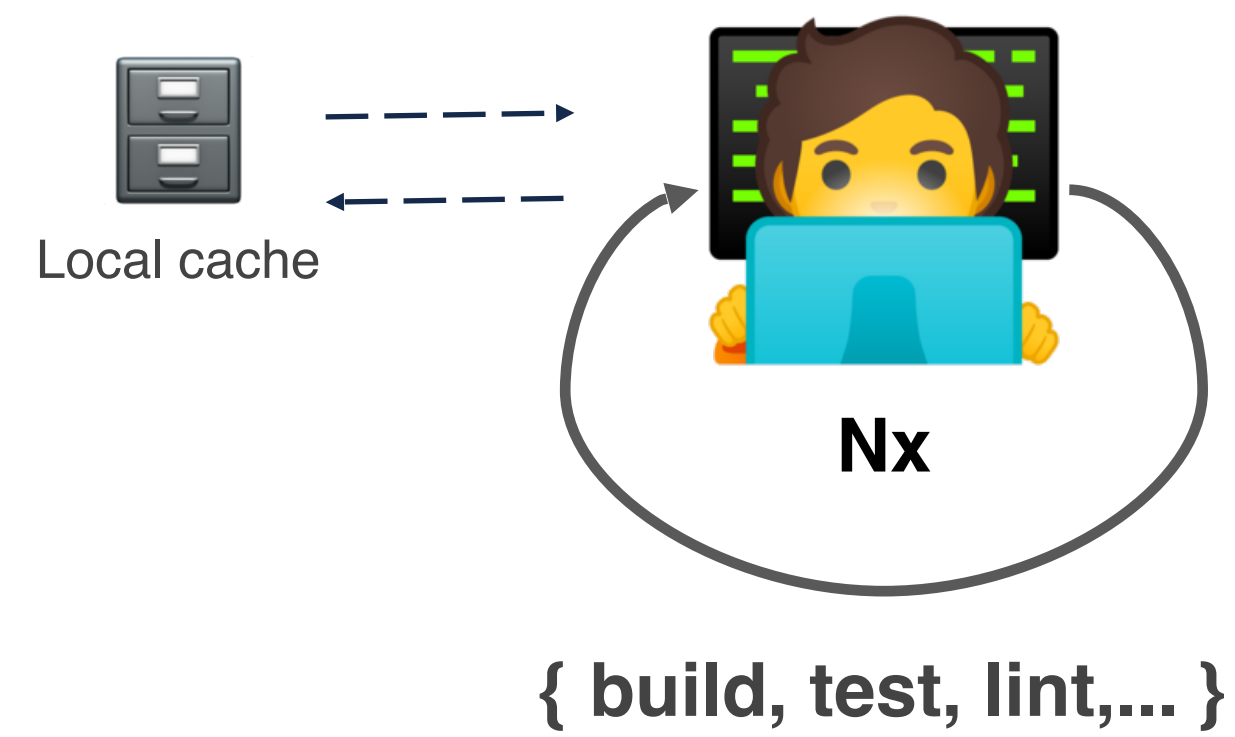
Run Commands

```
nx run app1:build  
nx run app2:build
```

Lab 15

Github Actions for Continuous Integration

Computational Cache

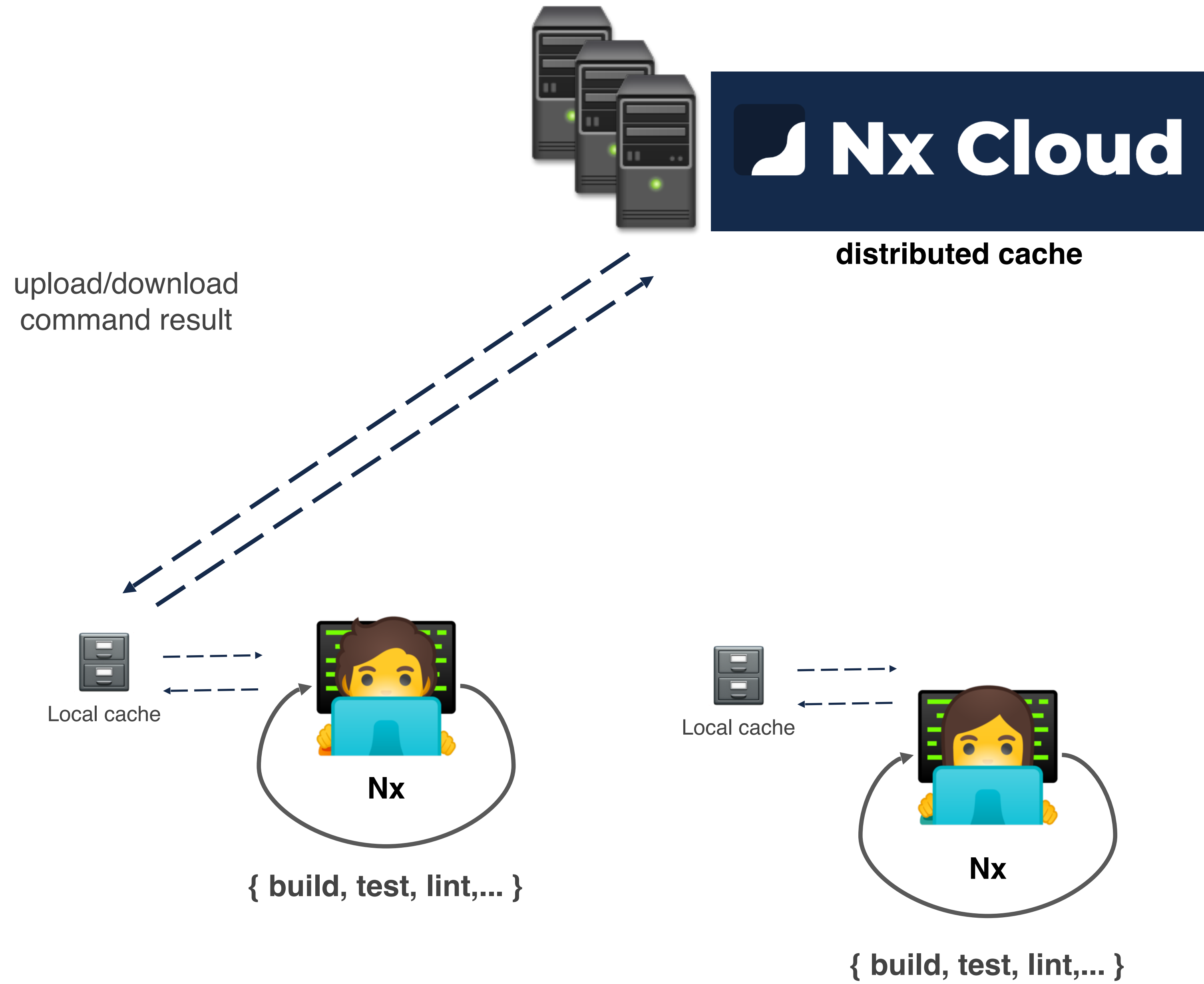




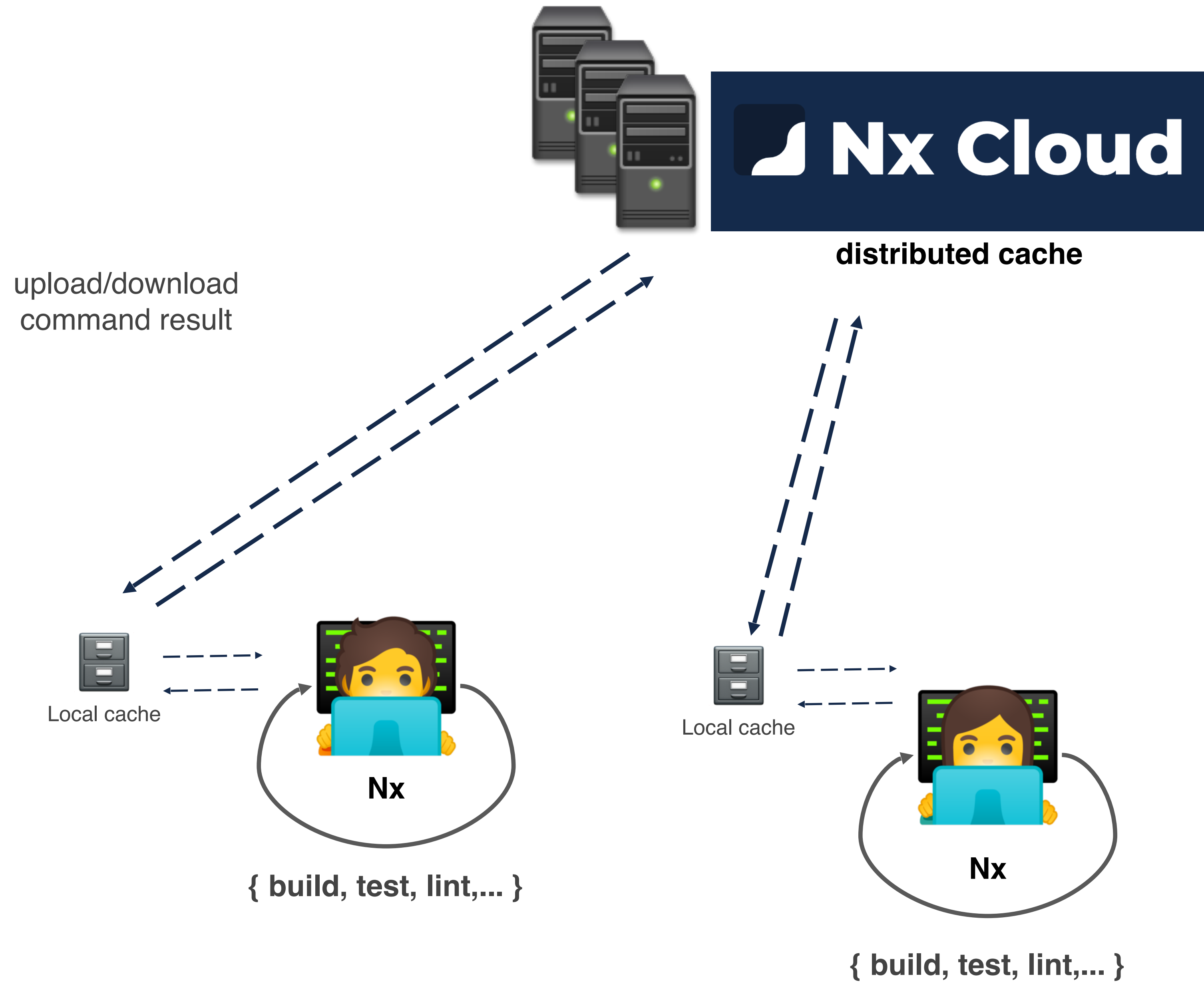
Never {build, test,...} twice

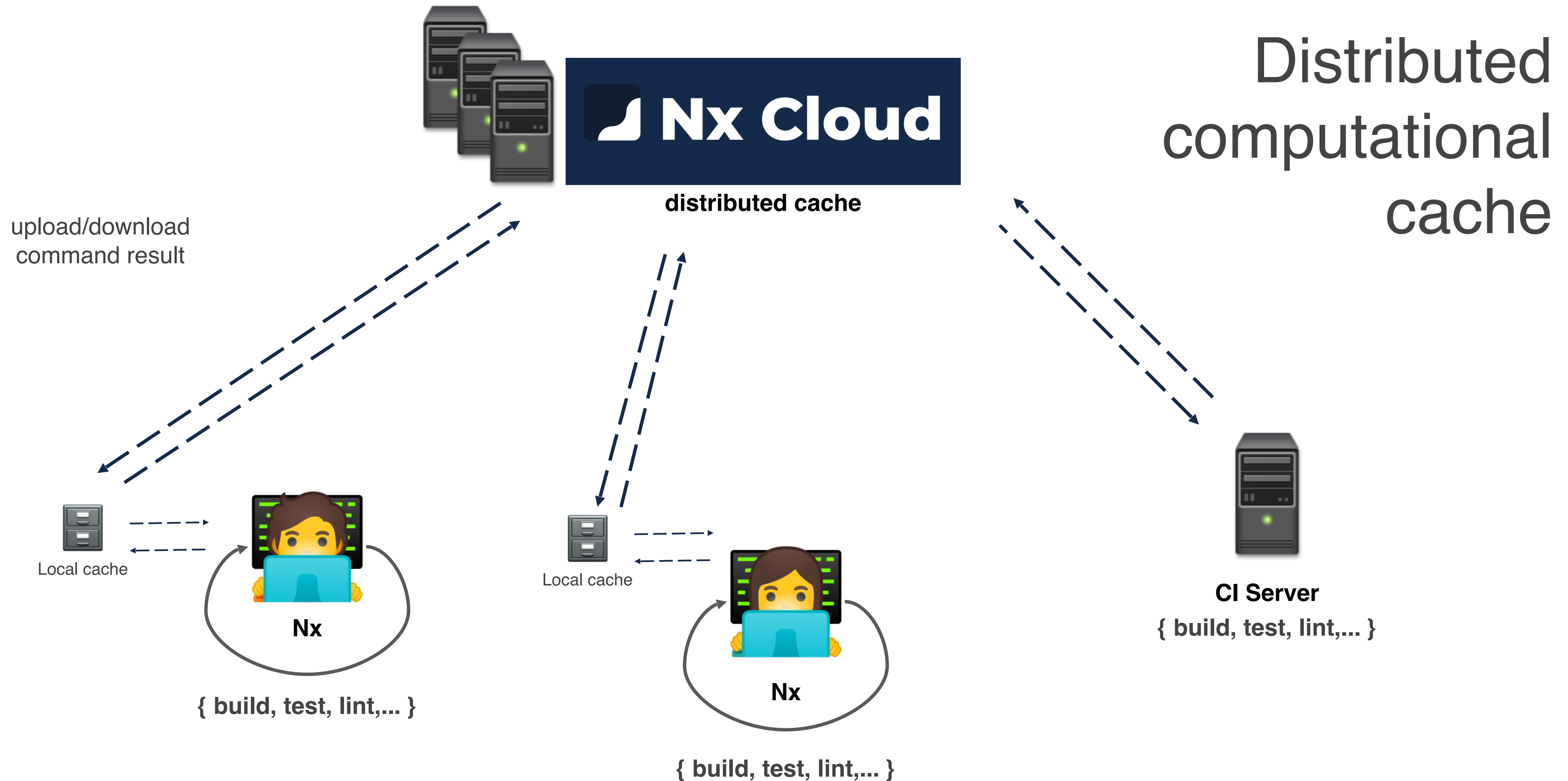
nx.app

Distributed computational cache



Distributed computational cache






Lab 16

Local Caching and Nx Cloud's Distributed Caching

Nx Cloud Github Bot

 nx-cloud bot commented 7 days ago • edited ▾

Nx Cloud Report

CI ran the following commands for commit [f6b966f](#) . Click to see the status, the terminal output, and the build insights.

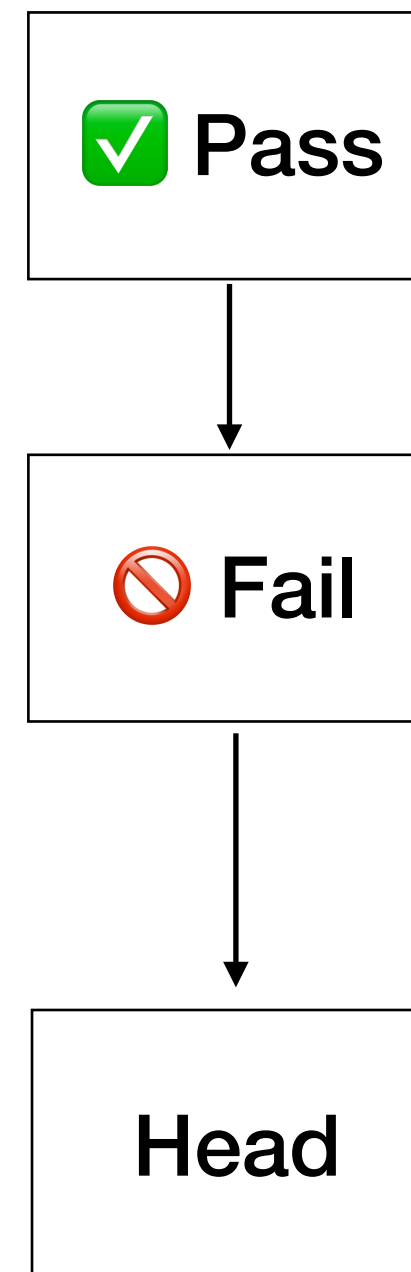
Status	Command	Start Time
■	<code>nx build-base express</code>	11/8/2020, 3:48:54 PM
■	<code>nx build-base nest</code>	11/8/2020, 3:48:54 PM
■	<code>nx build-base next</code>	11/8/2020, 3:48:49 PM
■	<code>nx build-base react</code>	11/8/2020, 3:48:49 PM
■	<code>nx run-many --target=build --all --parallel</code>	11/8/2020, 3:47:34 PM
■	<code>nx run-many --target=e2e --projects=e2e-angular</code>	11/8/2020, 3:48:49 PM
■	<code>nx run-many --target=e2e --projects=e2e-cypress,e2e-jest,e2e-nx-plugin</code>	11/8/2020, 3:48:59 PM
■	<code>nx run-many --target=e2e --projects=e2e-next</code>	11/8/2020, 3:50:10 PM
■	<code>nx run-many --target=e2e --projects=e2e-node</code>	11/8/2020, 3:48:39 PM
■	<code>nx run-many --target=e2e --projects=e2e-react</code>	11/8/2020, 3:48:41 PM
■	<code>nx run-many --target=e2e --projects=e2e-web,e2e-linter,e2e-storybook</code>	11/8/2020, 3:48:36 PM
■	<code>nx run-many --target=e2e --projects=e2e-workspace,e2e-cli</code>	11/8/2020, 3:49:05 PM
■	<code>nx run-many --target=test --all --parallel</code>	11/8/2020, 3:47:38 PM

Sent with ❤️ from NxCloud.

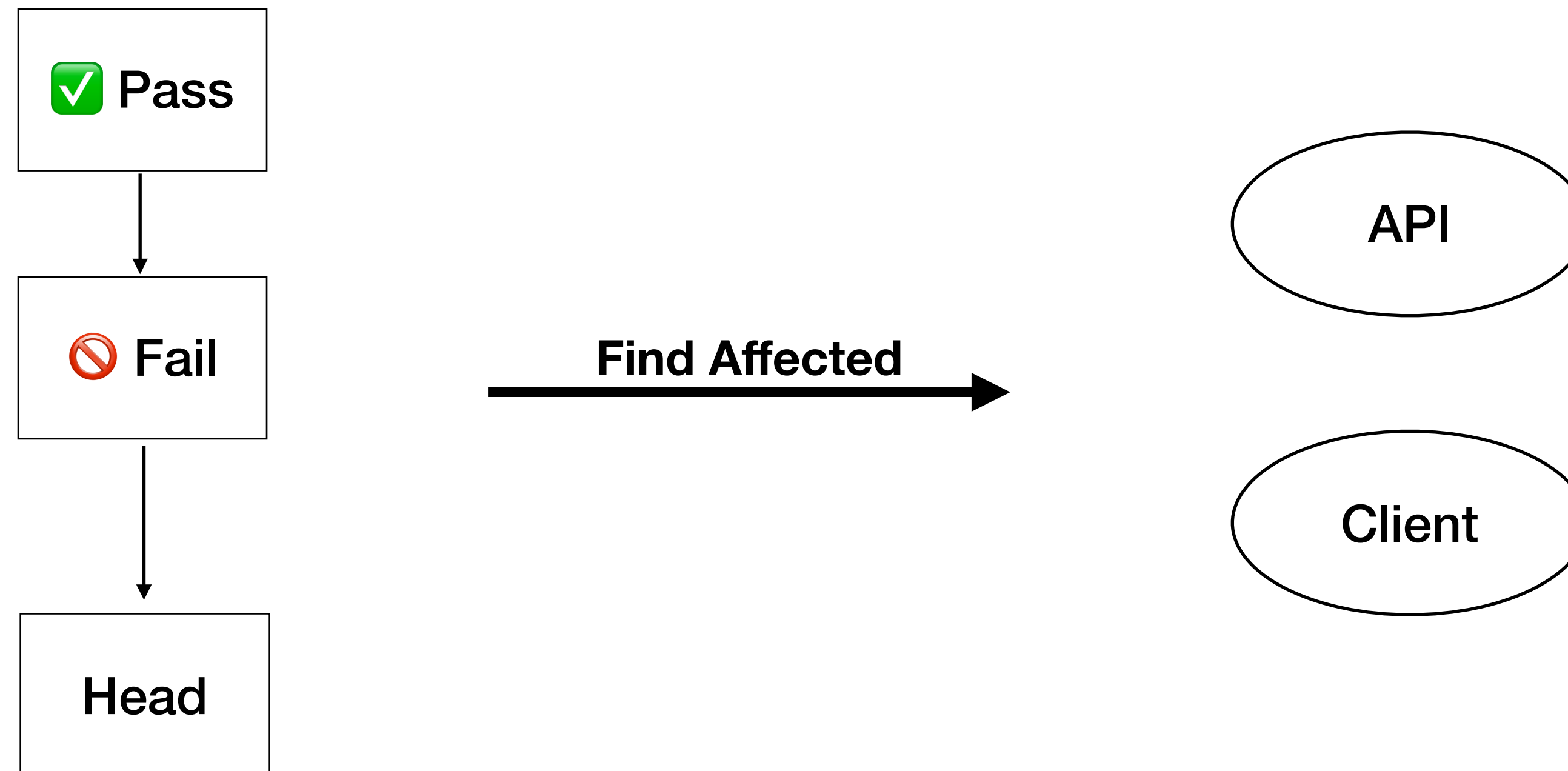
Lab 17

Nx Cloud Github Bot

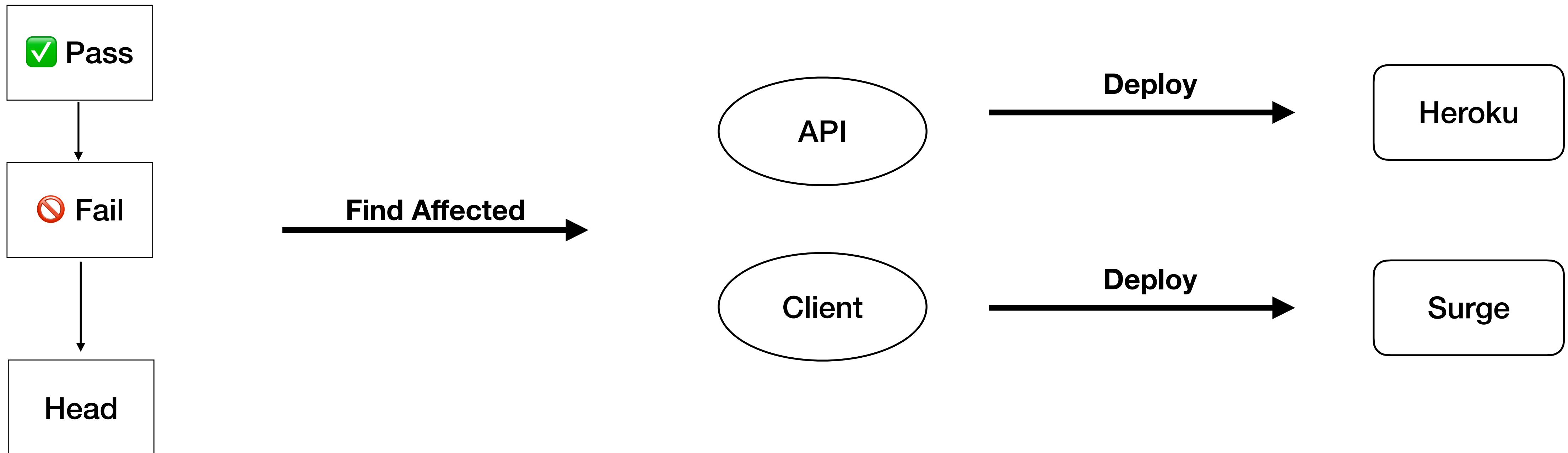
Deploying to Staging



Deploying to Staging



Deploying to Staging



Lab 18

Custom Executors with Run Commands

Labs 19/20

Chose your own adventure!

Advanced run-commands with Docker and Heroku



OR....

Exploring other generator plugins (React) and more advanced **custom**
workspace generators

Lab 21

Continuous Deployments on master

Lab 22

Deploying only what's been affected