

Performing Laparoscopic Lockfile Surgery

Luke Karrys



Who is
Luke Karrys





npm

Staff Software Engineer

May 2021 - May 2024

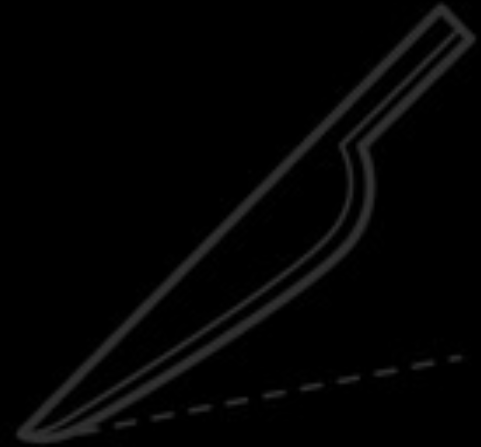
Responsible for

3+ billion downloads /mo
~**2%** of all registry traffic



ex. **semver, tar, which, ini, ssri, write-file-atomic, hosted-git-info, make-fetch-happen** & more...

Performing Laparoscopic **Lockfile Surgery**





Bret Comnes 

@bcomnes



Im doing lockfile surgery, send help

5:06 PM · Oct 29, 2024 · **2,054** Views

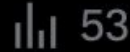




Wes @wesleytodd · Oct 29, 2024



What sort? I have mostly not found general diffing helpful and have mostly used more targeted approaches based on the error presented.

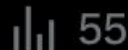




Bret Comnes  @bcomnes · Oct 29, 2024






The kind where you regenerate a lock file and a bunch of your own business logic bugs decide to show themselves.



Bret Comnes  @bcomnes · Oct 29, 2024



The kind of bug where a promise just hangs, no error.   





Wes @wesleytodd · Oct 29, 2024



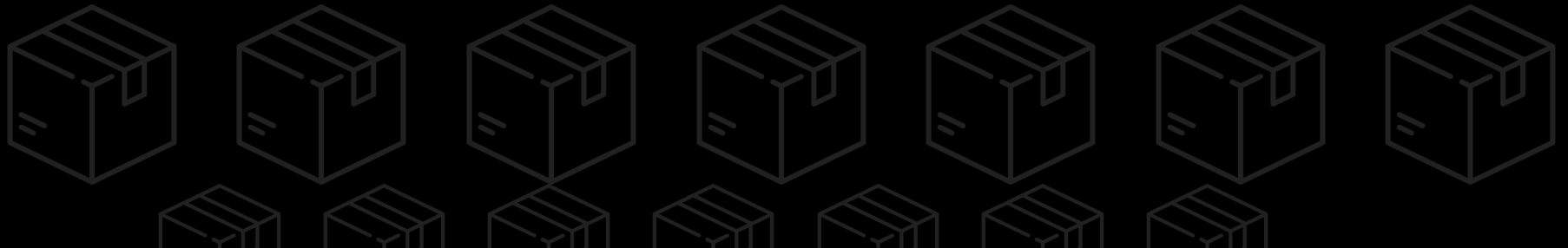
Oh no. Yeah this is one reason I try not to blow away the lockfile. I try pretty hard to make only small targeted updates. We really can have better tools for this than we do today.

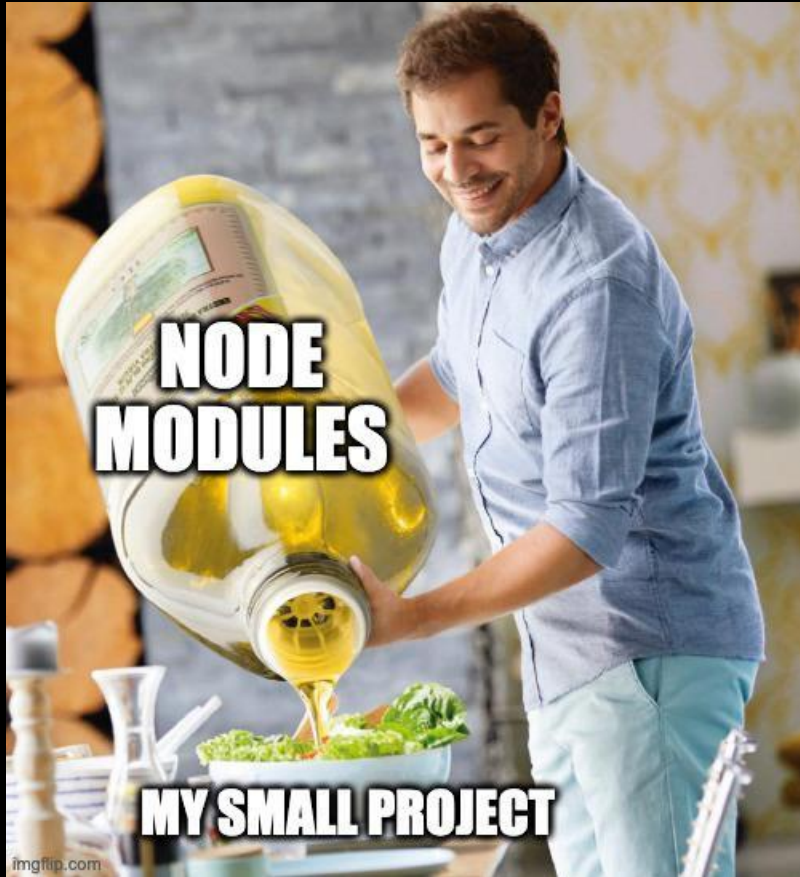


51

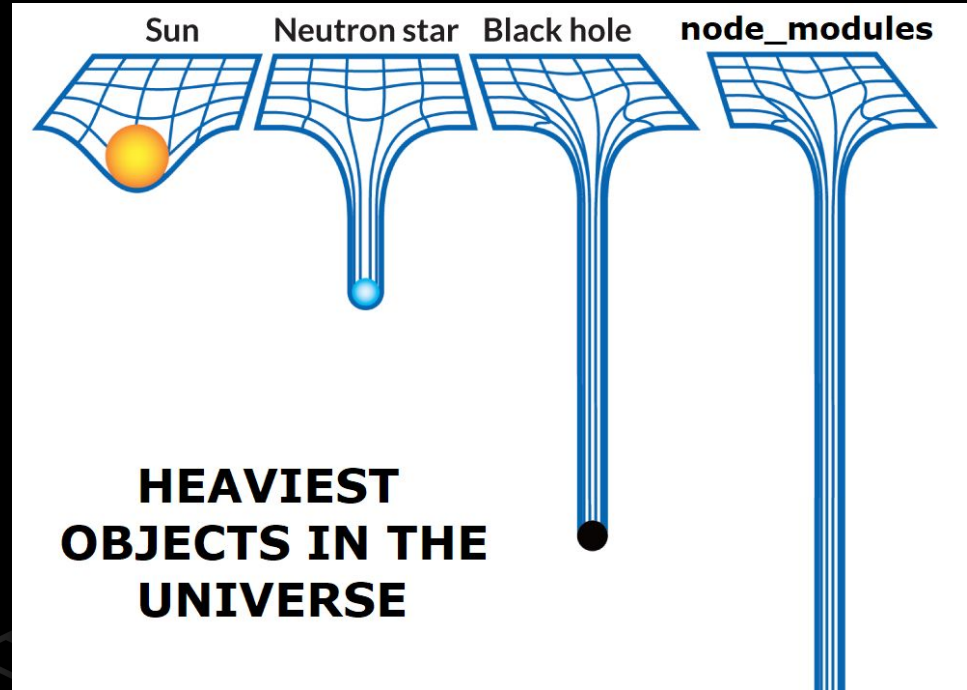


JavaScript projects have
a lot of Dependencies





imgflip.com



**HEAVIEST
OBJECTS IN THE
UNIVERSE**

The average project has...

~683 transitive

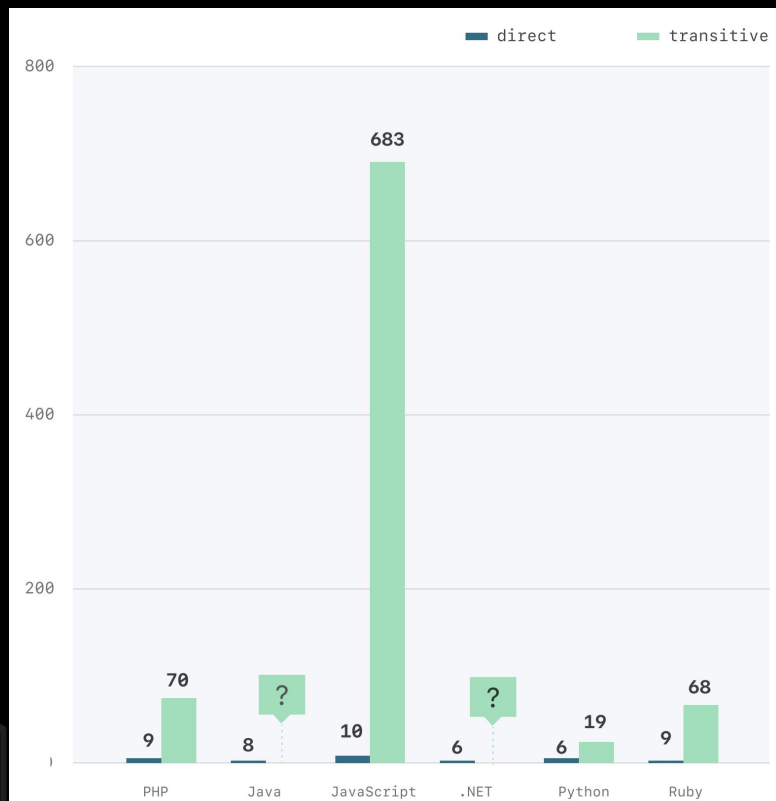
dependencies



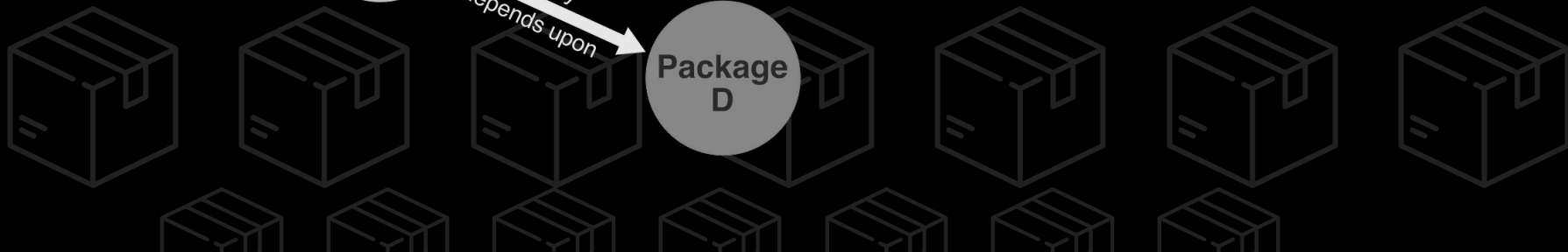
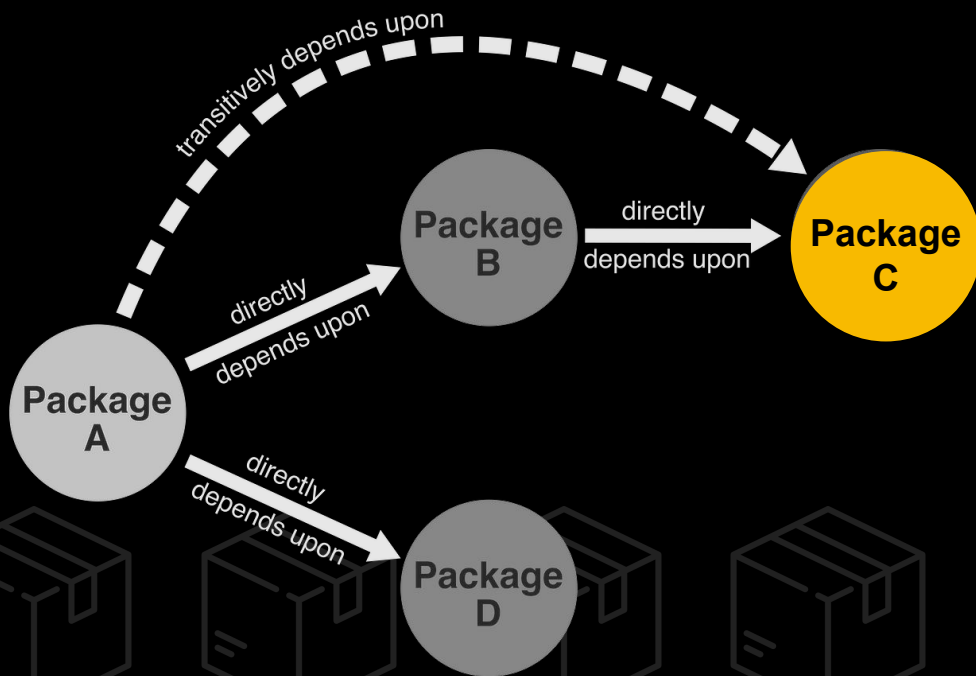
GitHub's State of the Octoverse:

<https://octoverse.github.com/2021> &

<https://octoverse.github.com/2020>



Transitive Dependencies



Current State of Solutions & Tooling



npm ls



npm ls

```
↳ npm ls
sonos-http-api@1.0.0 /Users/lukekarrys/projects/lukekarrys/node-sonos-http-api
├── @eslint/js@9.18.0
├── @polka/parse@1.0.0-next.28
├── @svrooij/sonos@2.6.0-beta.11
├── @types/body-parser@1.19.5
├── @types/cors@2.8.17
├── @types/node@22.10.7
├── cors@2.8.5
├── eslint@9.18.0
├── globals@15.14.0
├── polka@1.0.0-next.28
├── prettier@3.4.2
├── trouter@4.0.0
├── typescript-eslint@8.21.0
├── typescript@5.7.3
└── zod@3.24.1
```

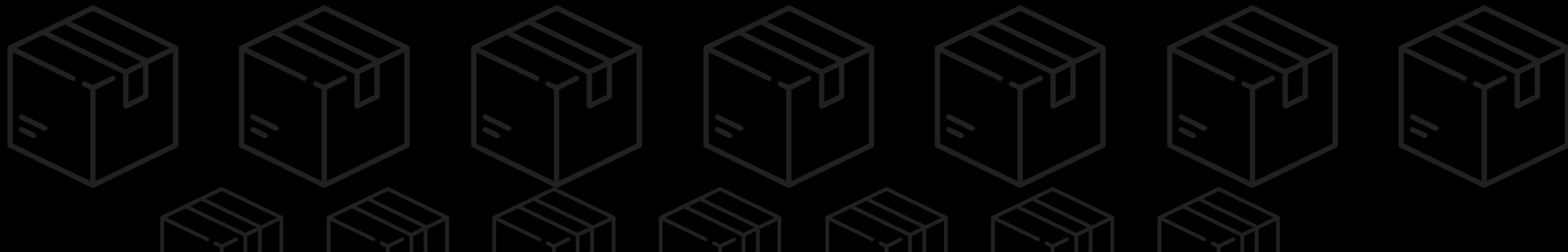


grep



grep

```
grep -F ".react@19" vlt-lock.json
".react@19.0.0": [0,"react","sha512-V8AVnmPIICiWpGfm6GLzCR/W5FXLchHop40W4nXBmdLEceh16rCN808LNWm5bh5XUX91fh7KpA+W0TgMKngTpQ==" ],
"file.. react": "prod ^19.0.0 ..react@19.0.0",
"..@react-aria$ssr@3.9.7 react": "peer ^16.8.0 || ^17.0.0-rc.1 || ^18.0.0 || ^19.0.0-rc.1 ..react@19.0.0",
"..@restart$hooks@0.4.16 react": "peer >=16.8.0 ..react@19.0.0",
"..@restart$hooks@0.5.1 react": "peer >=16.8.0 ..react@19.0.0",
"..@restart$ui@1.9.4 react": "peer >=16.14.0 ..react@19.0.0",
"..prop-types-extra@1.1.1 react": "peer >=0.14.0 ..react@19.0.0",
"..react-bootstrap@2.10.9 react": "peer >=16.14.0 ..react@19.0.0",
"..react-dom@19.0.0 react": "peer ^19.0.0 ..react@19.0.0",
"..react-scripts@5.0.1 react": "peer >= 16 ..react@19.0.0",
"..react-transition-group@4.4.5 react": "peer >=16.6.0 ..react@19.0.0",
"..uncontrollable@7.2.1 react": "peer >=15.0.0 ..react@19.0.0",
"..uncontrollable@8.0.4 react": "peer >=16.14.0 ..react@19.0.0",
```



There is **hope**...



Dependency Selectors



Dependency Selector Syntax (DSS)

<https://docs.vlt.sh/packages/query>

- Answer complex, multi-faceted questions about dependencies, their relationships & associative metadata
- Consolidates redundant logic of similar, legacy list commands
- CSS Selectors 4 Spec (syntax & operators)



Dependency Selector Syntax (DSS)

<https://docs.vlt.sh/packages/query>

```
*
:root > *
:root > .prod
:root > .dev
:root > * > .peer
.workspace
.workspace > .workspace
.workspace:has(*.peer)
[name=@vltpkg/query]
#lodash
#lodash[version~=1.2]
*:empty
*:has(*)
*:not(:empty)
*:type(git)
```

- all deps
- all direct deps
- direct production deps
- direct development deps
- any peer dep of a direct deps
- any workspace dep
- all workspaces that depend on another workspace
- all workspaces that have peer deps
- any deps named "@vltpkg/query"
- any dep named "lodash"
- any deps named "lodash" & version beginning with "1.2"
- deps with no other deps (ie. "leaf" nodes)
- has any deps
- "" - equivalent to the above
- querying for all git dependencies



Dependency Selector Syntax (DSS)

<https://docs.vlt.sh/packages/query>

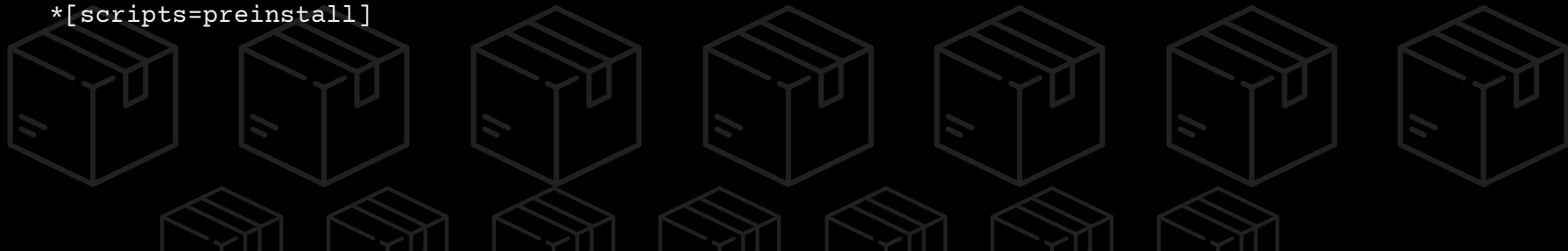
```
// find all dependencies with specific licenses
*[license="MIT"], *[license="ISC"]

// find all dependencies that have a node.engines property set
*:attr(engines,[node])

// find all dependencies that have defined react as an optional peer
*:has(#react):not(:attr(peerDependenciesMeta, react, [optional]))

// find all dependencies that have myself as a contributor
*:attr(contributors, [email=luke@lukekarrys.com])

// find all references to "install" scripts
*[scripts=install],
*[scripts=postinstall],
*[scripts=preinstall]
```



Command Line

```
vlt query "<selector>"
```

```
ex. vlt query "#react" | jq 'map(.name + "@" + .version)'
```



Programmatic Usage

@vltpkg/query

```
import { actual } from '@vltpkg/graph'  
import { Query } from '@vltpkg/query'  
  
const graph = await actual.load({ projectRoot: process.cwd() })  
const query = new Query([...graph.nodes.values()])  
query.search(':root > *')
```



Demo



Thanks!

Bluesky:

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Twitter:

@lukekarrys

GitHub:

@lukekarrys

Website:

lukekarrys.com

File a bug

<https://github.com/vltpkg/vltpkg/issues/new>

