ReSolVer
Resolution Integrity for npm

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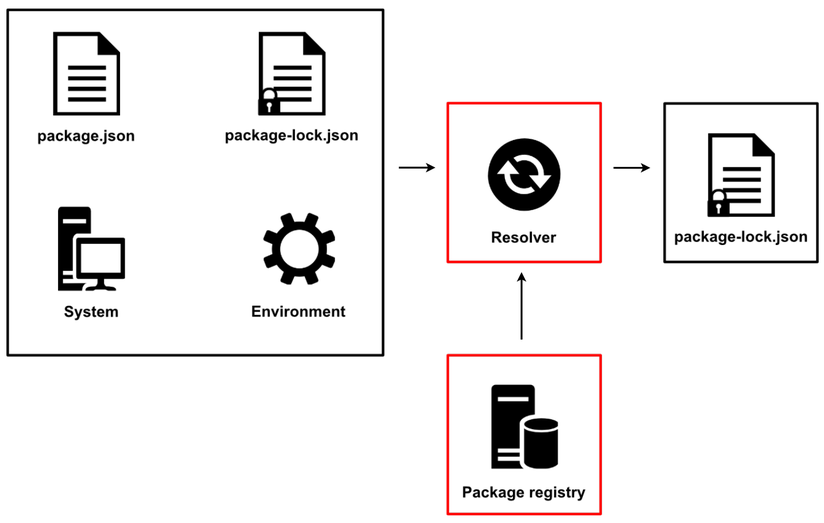
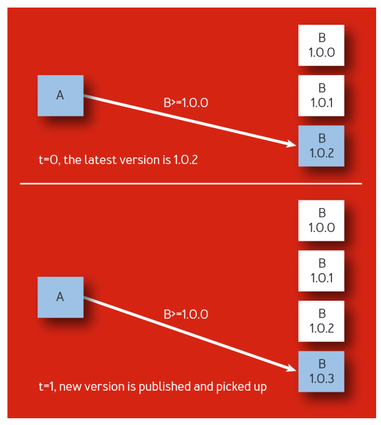
Zero Trust

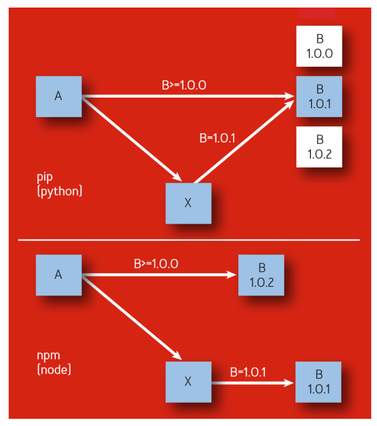


The Surprise of Multiple Dependency Graphs

Registry state changes over time as new packages and versions are published



Different resolvers produce different dependency graphs



Figures from Anugerah & Martin-Jones [1]

Record

Integrity Provenance

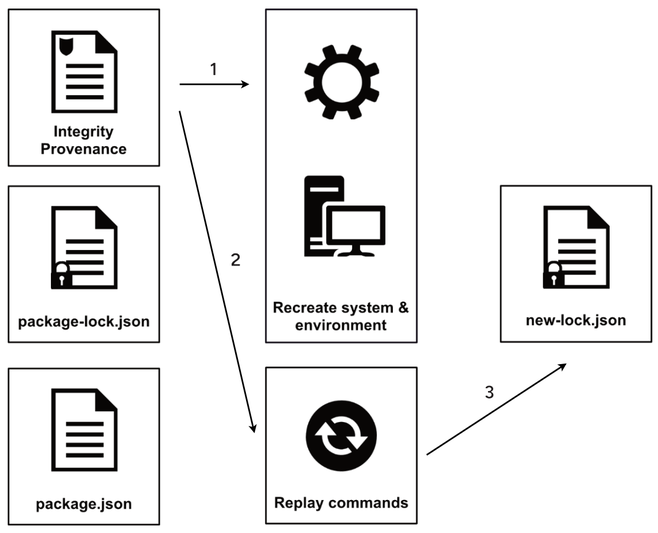
lockfileDigest

systemInfo

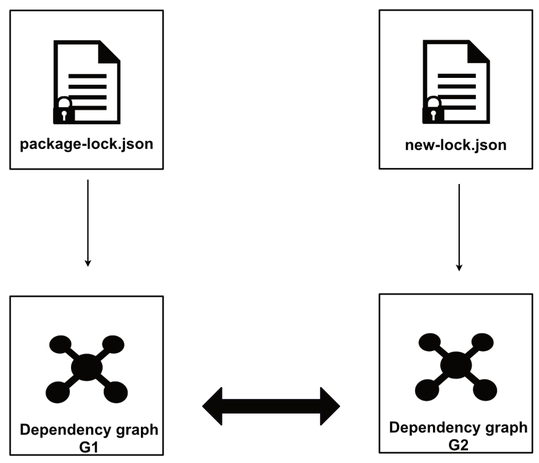
environmentInfo

commands:
[
[command1, timestamp1],
[command2, timestamp2],
...
]

ReSolve



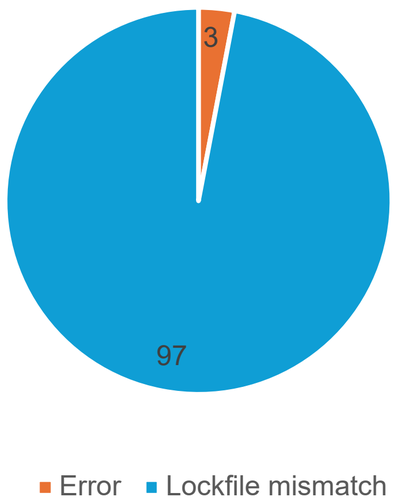
Verify



Preliminary Results

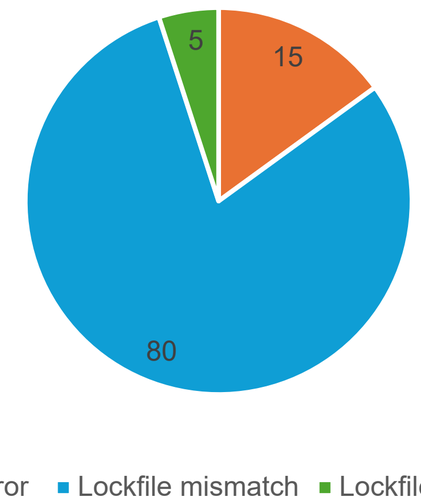
Three experiments were performed on 100 projects that published both a package.json and package-lock.json

Experiment 1



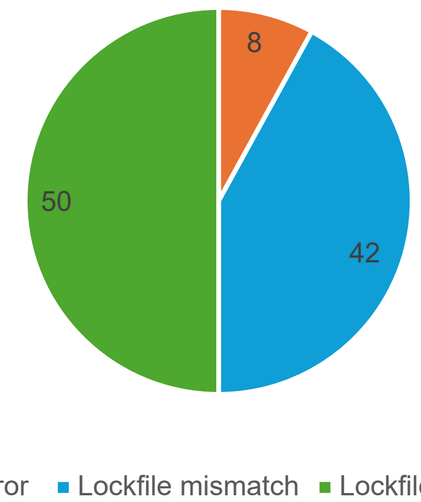
This experiment used the published manifest and ran the command `npm install`.

Experiment 2



This experiment used the published manifest and ran the command `npm install` but filtered out packages that were published after the commit time.

Experiment 3



This experiment used a manifest and lockfile from a previous commit. These were used to infer commands and resolution time between the two commits. The commands were then executed with package filtering according to the inferred time.

WARNING: Do not attempt these experiments at home. If you do, use the `--ignore-scripts` flag.
For more information, see any cybersecurity news site, any day of the week.

[1] Anugerah, Josie, and Eve Martin-Jones. 2025. "The Surprise of Multiple Dependency Graphs: Dependency Resolution Is Not Deterministic." Queue 23(1): 64–84. doi:10.1145/3723000.