{verdepcheck} - A Tool for Dependencies Check

useR! 2024, Salzburg

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Is the DESCRIPTION valid for all versions of `{glue}`?

(DESCRIPTION file of an R package)

```
1:  Package: a.new.package
2:  Type: Package
3:  Version: 0.1.0
4:  Depends:
5:      R (>= 4.1.0)
6:  Imports:
7:      glue
```

(R/hello.R)

```
1:  # Hello, world!
2:  hello <- function(name = "world") {
3:    print(
4:      glue::glue(
5:        "Hello, {glue::backtick(name)}!"
6:      )
7:    )
8:  }
```

Is the DESCRIPTION valid for all versions of `{glue}`?

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```

❌ Error: object 'backtick' is not exported by 'namespace:glue'

Is the DESCRIPTION valid for all versions of {glue}?

(DESCRIPTION file of an R package)

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2:  Type: Package
3:  Version: 0.1.0
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5:      R (>= 4.1.0)
6:  Imports:
7:      glue (>= 1.1.0) ✅
```

(R/hello.R)

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```

We need a tool to check the package against different versions of dependencies

{verdepcheck} - Version Dependency Check

Workflow

1. Use empty libPath
2. **Install dependencies** (depending on strategy)
3. R CMD check
4. Report on results

Available strategies

All strategies will run R CMD check and build vignettes

Minimum versions[12]

- Test API availability

- Existing bugs with old version

Released versions

- Test with the latest releases of dependencies

- Lookup Github releases if not on CRAN

(similar to R CMD check)

Development versions

- Anticipates future problems

- Breaking changes and new bugs

(fallbacks to latest release)

Available strategies

Posit Package Manager (PPM) has daily snapshots of CRAN

Min. Isolated

Minimum versions[1]

Uses different PPM snapshot for **each package direct dependency**
(reconciles at end)

Min. Cohort

Minimum versions[2]

Uses PPM snapshot with latest published date of all minimum versions

Released versions

○ Test with the latest releases of dependencies

○ Lookup Github releases if not on CRAN

(similar to R CMD check)

Development versions

○ Anticipates future problems
○ Breaking changes and new bugs

(fallbacks to latest release)

Minimum Isolated

Multiple PPM snapshots + Github releases

dplyr-1.0.0 (36)
2020-05-29

```
> resolve_ppm_snapshot("dplyr", "≥", "1.0.0")
# A data frame: 20 × 34
    ref        type   direct directpkg status package versio
    <chr>      <chr>  <lgl>  <lgl>     <chr>  <chr>   <chr>
 1  R6         stan…  FALSE  FALSE     OK     R6      2.4.1
 2  assertt…   stan…  FALSE  FALSE     OK     assert… 0.2.1
 3  cli        stan…  FALSE  FALSE     OK     cli     2.0.2
 4  crayon     stan…  FALSE  FALSE     OK     crayon  1.3.4
 5  digest     stan…  FALSE  FALSE     OK     digest  0.6.25
 6  dplyr      stan…  FALSE  FALSE     OK     dplyr   1.0.0
 7  ellipsis   stan…  FALSE  FALSE     OK     ellips… 0.3.1
 8  fansi      stan…  FALSE  FALSE     OK     fansi   0.4.1
 9  generics   stan…  FALSE  FALSE     OK     generi… 0.0.2
10  glue       stan…  FALSE  FALSE     OK     glue    1.4.1
11  lifecyc…   stan…  FALSE  FALSE     OK     lifecy… 0.2.0
12  magrittr   stan…  FALSE  FALSE     OK     magrit… 1.5
13  pillar     stan…  FALSE  FALSE     OK     pillar  1.4.4
14  pkgconf…   stan…  FALSE  FALSE     OK     pkgcon… 2.0.3
15  purrr      stan…  FALSE  FALSE     OK     purrr   0.3.4
16  rlang      stan…  FALSE  FALSE     OK     rlang   0.4.6
17  tibble     stan…  FALSE  FALSE     OK     tibble  3.0.1
18  tidysel…   stan…  FALSE  FALSE     OK     tidyse… 1.1.0
19  utf8       stan…  FALSE  FALSE     OK     utf8    1.1.4
20  vctrs      stan…  FALSE  FALSE     OK     vctrs   0.3.0
# i 16 more variables: target <chr>, deps <list>, mirror
#   dep_types <list>, params <list>, sysreqs <chr>, cach
#   sysreqs_install <chr>
```

tibble-2.0.0 (25)
2019-01-04

```
> resolve_ppm_snapshot("tibble", "=", "2.0.0")
# A data frame: 9 × 34
    ref        type   direct directpkg status package versio
    <chr>      <chr>  <lgl>  <lgl>     <chr>  <chr>   <chr>
1  assertth…   stan…  FALSE  FALSE     OK     assert… 0.2.0
2  cli         stan…  FALSE  FALSE     OK     cli     1.0.1
3  crayon      stan…  FALSE  FALSE     OK     crayon  1.3.4
4  fansi       stan…  FALSE  FALSE     OK     fansi   0.4.0
5  pillar      stan…  FALSE  FALSE     OK     pillar  1.3.1
6  pkgconfig   stan…  FALSE  FALSE     OK     pkgcon… 2.0.2
7  rlang       stan…  FALSE  FALSE     OK     rlang   0.3.0.
8  tibble      stan…  FALSE  FALSE     OK     tibble  2.0.0
9  utf8        stan…  FALSE  FALSE     OK     utf8    1.1.4
# i 16 more variables: target <chr>, deps <list>, mirror
#   dep_types <list>, params <list>, sysreqs <chr>, cach
#   sysreqs_install <chr>
```

```
...: (...)
 6: Imports:
 7:    dplyr (>= 1.0.0),
 8:    tibble (>= 2.0.0),
 9:    formatters (>= 0.5.2)
10: Config/Needs/verdepcheck:
11:    tidyverse/dplyr,
12:    tidyverse/tibble,
13:    insightsengineering/formatters
```

formatters-0.5.2 (25)
2023-08-25

```
> resolve_ppm_snapshot("formatters", "≥", "0.5.1")
# A data frame: 9 × 34
    ref        type   direct directpkg status package versi
    <chr>      <chr>  <lgl>  <lgl>     <chr>  <chr>   <chr>
1  backports   stan…  FALSE  FALSE     OK     backpo… 1.4.1
2  base64enc   stan…  FALSE  FALSE     OK     base64… 0.1-3
3  checkmate   stan…  FALSE  FALSE     OK     checkm… 2.2.0
4  digest      stan…  FALSE  FALSE     OK     digest  0.6.3
5  ellipsis    stan…  FALSE  FALSE     OK     ellips… 0.3.2
6  fastmap     stan…  FALSE  FALSE     OK     fastmap 1.1.1
7  formatters  stan…  FALSE  FALSE     OK     format… 0.5.2
8  htmltools   stan…  FALSE  FALSE     OK     htmlto… 0.5.6
9  rlang       stan…  FALSE  FALSE     OK     rlang   1.1.1
# i 16 more variables: target <chr>, deps <list>, mirror
#   dep_types <list>, params <list>, sysreqs <chr>, cach
#   sysreqs_install <chr>
```

Reconciles at the end
- rlang *(resolves to 0.3.0, 0.4.6 & 1.1.1)*
- When release x.y.z doesn't exist, it chooses the next available
- Fallback to Github releases

Minimum Cohort
Single PPM snapshot + Github releases

dplyr-1.0.0
2020-05-29

tibble-2.0.0
2019-01-04

```
...: (...)
 6: Imports:
 7:   dplyr (>= 1.0.0),
 8:   tibble (>= 2.0.0),
 9:   formatters (>= 0.5.2)
10: Config/Needs/verdepcheck:
11:   tidyverse/dplyr,
12:   tidyverse/tibble,
13:   insightsengineering/formatters
```

formatters-0.5.2 (all)
2023-08-25

Chooses a snapshot date
○ 25 August 2023

Release
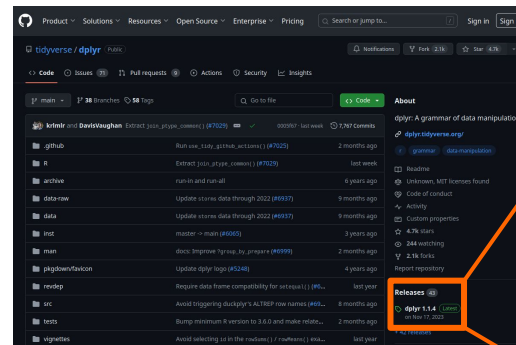CRAN + Github releases

from **CRAN**

The Comprehensive R Archive Network

Download and Install R

Precompiled binary distributions of the base system and contributed packages, **Windows and Mac** users most likely want one of these versions of R:

- Download R for Linux (Debian, Fedora/Redhat, Ubuntu)
- Download R for macOS
- Download R for Windows

R is part of many Linux distributions, you should check with your Linux package management system in addition to the link above.

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The R Journal

Software

```
...: (...)
  6: Imports:
  7:    dplyr (>= 1.0.0),
  8:    tibble (>= 2.0.0),
  9:    formatters (>= 0.5.2)
 10: Config/Needs/verdepcheck:
 11:    tidyverse/dplyr,
 12:    tidyverse/tibble,
 13:    insightsengineering/formatters
```
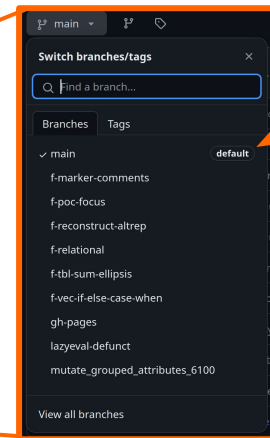
and **Github Releases**
(fallback)

Releases 43

🏷 **dplyr 1.1.4** (Latest)
on Nov 17, 2023

+ 42 releases

Max
Latest Github + CRAN

from **Github**
default branch

and **CRAN**
(fallback)

```
...: (...)
 6: Imports:
 7:    dplyr (>= 1.0.0),
 8:    tibble (>= 2.0.0),
 9:    formatters (>= 0.5.2)
10: Config/Needs/verdepcheck:
11:    tidyverse/dplyr,
12:    tidyverse/tibble,
13:    insightsengineering/formatters
```
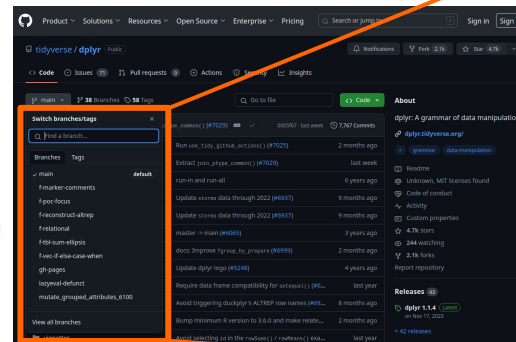
How to use it?

Locally

```
1: pak::pak("insightsengineering/verdepcheck")
2: # or via {renv} / {remotes}
3:
4: verdepcheck::min_isolated_deps_check()
5: verdepcheck::min_cohort_deps_check()
6: verdepcheck::release_deps_check()
7: verdepcheck::max_deps_check()
```

Continuous Integration

```
1: jobs:
2:  check:
3:   runs-on: ubuntu-latest
4:   name: Dependency Test
5:   container:
6:    image: rocker/tidyverse:4.1.2
7:
8:   steps:
9:    - name: Checkout repo
10:     uses: actions/checkout@v3
11:     with:
12:      path: repository
14:    - name: Run Dependency Test
15:     uses: insightsengineering/r-verdepcheck-action@v1
16:     with:
17:      github-token: ${{ secrets.REPO_GITHUB_TOKEN }}
18:      strategy: release
19:
20:    - name: Upload lock file
21:     if: always()
22:     uses: actions/upload-artifact@v3
23:     with:
24:      name: lock-file
25:      path: pkg.lock
```

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Possible limitations. Additional comments.

- Compatible with CRAN and GH only
- Sometimes a failures are expected, especially in the "release" or "devel" strategy.
- Failures are not always actionable. You might discover someone else's issues.
- It's difficult or sometimes impossible to control indirect dependencies.
- It is dependent on higher level environment (system) settings. When building from source: possible compilation issues of very old version of packages with a recent compiler.

Thank you!

insightsengineering/verdepcheck

insightsengineering/r-verdepcheck-action