

R-Universe: towards a unifying infrastructure and global catalog for the wider R ecosystem

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R-universe is rOpenSci's evolving platform for improving publication and discovery of research software in R, and currently developed as a top-level R-consortium project. It fills a need for modern, scalable, user-friendly publishing in the R ecosystem.

At first glance, R-universe serves as a global catalog of software, articles, and datasets found on CRAN, BioConductor, as well as self-published repositories. It aids discovery through a powerful search engine that indexes and ranks all content using R specific criteria, and by cross referencing related projects based on authorship and topics. For each package, extensive information is made available through attractive webpages and APIs that include rendered documentation, health and activity metrics, binaries and installation instructions, and a wealth of other material to learn about a project and get started using it.

The screenshot shows a web browser displaying the R-universe website at r-spatial.r-universe.dev. The main navigation bar includes links for Builds, Packages, Articles, Datasets, Contribution, Badges, API, and Feed. A "Website Tour!" button is also present. The central content area is titled "Package: sf 1.0-18". It features a large thumbnail image showing various spatial data layers (raster, vector, and map overlays). To the right of the thumbnail is a portrait of Edzer Pebesma. Below the title, the package name "sf" is displayed with a blue hexagonal icon containing the letters "sf". A brief description states: "Support for simple features, a standardized way to encode spatial vector data. Binds to 'GDAL' for reading and writing data, to 'GEOS' for geometrical operations, and to 'PROJ' for projection conversions and datum transformations. Uses by default the 's2' package for spherical geometry operations on ellipsoidal (long/lat) coordinates." The authors listed are Edzer Pebesma, Roger Bivand, Etienne Racine, Michael Sumner, Ian Cook, Tim Keitt, Robin Lovelace, Hadley Wickham, Jeroen Ooms, Kirill Müller, Thomas Lin Pedersen, Dan Baston, and Dewey Dunnington. Below the authors is a list of download links for different file formats (tar.gz, zip, tgz) for various operating systems (r-4.5, r-4.4, r-4.3, arm64). There are also links for sf.pdf, sf.html, sfjson (API), and NEWS. A code snippet for installing the package in R is provided:

```
# Install 'sf' in R:  
install.packages('sf', repos = c('https://r-spatial.r-universe.dev', 'https://cloud.r-project.org'))
```

 A bug tracker link (<https://github.com/r-spatial/sf/issues>) with 64 issues is shown. The package uses libproj (Cartographic projection library), gdal (Geospatial Data Abstraction Library), geos (Geometry engine for Geographic Information Systems), and c++ (GNU Standard C++ Library v3). The package was released on CRAN on September 06, 2024. At the bottom, there are tags for gdal, geos, proj, spatial, and spatial.

For developers, R-universe serves as a publication platform providing a fully automated pipeline for testing, building, and publishing R packages. In this sense R-universe can be seen as a meta-repository and common infrastructure for both individuals or organizations to manage custom R package repositories using their own approach to curation, release management, and quality control. The build system is based on the inherently scalable GitHub Actions infrastructure, making it easy and maintain and extend. This way R-Universe enhances R's promise as a multi-repository-by-design ecosystem, reducing the barrier to entry for groups of all scales.