


# Software in bibliographies with `biblatex-software`

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Software Heritage  
THE GREAT LIBRARY OF SOURCE CODE



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2 biblatex-software in a nutshell

3 Use and contribute

## Inria (<https://www.inria.fr>)

- French national research institution for digital sciences (CS, applied Maths, ...)
- 200 teams federating some 3500 researchers
- 1000+ open source software projects over 50 years

## The software citation working group

**Contributors** Pierre Alliez, Roberto Di Cosmo, Benjamin Guedj, Alain Girault, Mohand-Said Hacid, Arnaud Legrand, Xavier Leroy, Nicolas Rougier, Manuel Serrano

- Outputs**
- P. Alliez, R. Di Cosmo, B. Guedj, A. Girault, M. Hacid, A. Legrand, N. Rougier, *Attributing and Referencing (Research) Software: Best Practices and Outlook From Inria*, Computing in Science and Engineering, 22 (1), 2020. DOI: 10.1109/MCSE.2019.2949413
  - `biblatex-software` : software bibitems for BibLaTeX

## BibTeX

Bibliographic format widely used in the scholarly world by  $\text{\LaTeX}$  users to store and exchange bibliographic information.

At Inria it is used to generate bibliographies for the activity reports of 200 teams

## BibLaTeX

Modern  $\text{\LaTeX}$  package (and tool set) that produces rich bibliographies from BibTeX entries

## State of software:

No support for software in BibTeX/BibLaTeX up to now:

- BibLaTeX has a `@software` bibitem, that is treated like `@misc`



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## Four new bibliographic entries

**@software** Computer software.

*Required fields:* `author / editor`, `title`, `url`, `year`

**@softwareversion** A specific version of a software.

*Required fields:* `author / editor`, `title`, `url`, `version`, `year`

**@softwaremodule** A specific module of a larger software project.

*Required fields:* `author`, `subtitle`, `url`, `year`

**@codefragment** A code fragment (e.g. a specific algorithm in a program or library).

*Required fields:* `url`

## Inheritance

**softwareversion**, **softwaremodule** and **codefragment** entries can inherit missing fields from entries designated via the *crossref* field

## Four new software-specific fields

- license** list (literal). The license/s of the title in SPDX format.
- introducedin** field (literal). If this is a software module or fragment, the version of the containing project where it has been first introduced.
- repository** field (uri). The url of the code repository (e.g on GitHub, GitLab).
- swhid** field (verbatim). The identifier of the digital object (a.k.a the software artifact itself). The intrinsic identifier of the item is an swh-id (swh:cnt for a content, swh:dir for a directory, swh:rev for a revision, swh:rel for a release, etc.). See [the SWH-ID specification](#).

## Two more new software-specific fields for HAL

- hal\_id** field (verbatim). A digital identifier for the software record including its description and metadata on HAL.
- hal\_version** field (verbatim). The version of the HAL software record.

# Examples are worth a thousand words


## Software, Softwareversion and Softwaremodule

```
@software {cgal,  
  title = {The Computational Geometry Algorithms Library},  
  author = {{The CGAL Project}},  
  editor = {{CGAL Editorial Board}},  
  year = 1996,  
  url = {https://cgal.org/}  
}  
  
@softwareversion{cgal:5-0-2,  
  crossref = {cgal},  
  version = {{5.0.2}},  
  url = {https://docs.cgal.org/5.02},  
  year = 2020,  
  swhid = {swh:1:rel:636541bbf6c77863908eae744610a3d91fa58855;  
    origin=https://github.com/CGAL/cgal/}  
}  
  
@softwaremodule{cgal:lp-gi-20a,  
  crossref = {cgal:5-0-2},  
  author = {Menelaos Karavelas},  
  subtitle = {{2D} Voronoi Diagram Adaptor},  
  license = {GPL},  
  introducedin = {cgal:3-1},  
  url = {https://doc.cgal.org/5.0.2/Manual/packages.html#pkgVoronoiDiagram2},  
}
```






[SOFTWARE] The CGAL Project, *The Computational Geometry Algorithms Library* (Coordinated by CGAL Editorial Board), 1996. URL: <https://cgal.org/>.



[SOFTWARE RELEASE] The CGAL Project, *The Computational Geometry Algorithms Library* version 5.0.2 (Coordinated by CGAL Editorial Board), 2020. URL: <https://docs.cgal.org/5.02>, SWHID: `<swh:1:rel:636541bbf6c77863908eae744610a3d91fa58855;origin=https://github.com/CGAL/cgal/>`.



[SOFTWARE MODULE] M. Kavelas, “2D Voronoi Diagram Adaptor”, part of *The Computational Geometry Algorithms Library* version 5.0.2 (Coordinated by CGAL Editorial Board), 2020. LIC: GPL. URL: <https://doc.cgal.org/5.0.2/Manual/packages.html#PkgVoronoiDiagram2>, SWHID: `<swh:1:rel:636541bbf6c77863908eae744610a3d91fa58855;origin=https://github.com/CGAL/cgal/>`.

Texts in blue are **clickable links**, try them!


## Software, Softwareversion and Codefragment


```
@software {parmap,
  title = {The Parmap library},
  author = {Di Cosmo, Roberto and Marco Danelutto},
  year = {2012},
  institution = {{University Paris Diderot} and {University of Pisa}},
  url = {https://rdicosmo.github.io/parmap/},
  license = {LGPL-2.0},
}

@softwareversion {parmap-0.9.8,
  version = {0.9.8},
  swhid = {swh:1:rev:0064fbd0ad69de205ea6ec6999f3d3895e9442c2;
  origin=https://gitorious.org/parmap/parmap.git},
  crossref = {parmap}
}

@codefragment {simplemapper,
  subtitle = {Core mapping routine},
  swhid = {swh:1:cnt:d5214ff9562a1fe78db51944506ba48c20de3379;
  origin=https://gitorious.org/parmap/parmap.git;
  anchor=swh:1:rev:0064fbd0ad69de205ea6ec6999f3d3895e9442c2;path=/parmap.ml;lines=101-143},
  crossref = {parmap-0.9.8}
}
```

 [SOFTWARE] R. Di Cosmo and M. Danelutto, *The Parmap library*, 2012. University Paris Diderot and University of Pisa. LIC: LGPL-2.0. URL: <https://rdicosmo.github.io/parmap/>, vcs: <https://github.com/rdicosmo/parmap/>.

 [SOFTWARE RELEASE] R. Di Cosmo and M. Danelutto, *The Parmap library* version 0.9.8, 2012. University Paris Diderot and University of Pisa. LIC: LGPL-2.0. URL: <https://rdicosmo.github.io/parmap/>, vcs: <https://github.com/rdicosmo/parmap/>, SWHID: `<swh:1:rev:0064fbd0ad69de205ea6ec6999f3d3895e9442c2;origin=https://gitorious.org/parmap/parmap.git>`.

 [SOFTWARE EXCERPT] R. Di Cosmo and M. Danelutto, “Core mapping routine”, from *The Parmap library* version 0.9.8, 2012. University Paris Diderot and University of Pisa. LIC: LGPL-2.0. URL: <https://rdicosmo.github.io/parmap/>, vcs: <https://github.com/rdicosmo/parmap/>, SWHID: `<swh:1:cnt:d5214ff9562a1fe78db51944506ba48c20de3379;origin=https://gitorious.org/parmap/parmap.git;anchor=swh:1:rev:0064fbd0ad69de205ea6ec6999f3d3895e9442c2;path=/parmap.ml;line=101-143>`.

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## Five new options to control typesetting of software related entries

`swlabels=true|false` add a special label to software entries

`license=true|false` show license information

`halid=true|false` show the HAL identifier

`swhid=true|false` show the SWHID identifier

`vcs=true|false` show the repository URL

## Adding other identifiers

- `doi`, `hal_id`, `shwid`, `vcs`, `url` are **built-in**
- other identifiers are easy to add using `eprint` (see full documentation)

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# A style extension compatible with all existing BibLaTeX style

Three simple steps

1) copy the relevant files into your article's directory

```
software.bbx software.dbx software-biblatex.sty  
english-software.lbx
```

2) pass the `datamodel=software` option when loading biblatex

```
\usepackage[datamodel=software]{biblatex}
```

3) load `software-biblatex`

```
\usepackage{software-biblatex}
```

That's it!

(see the documentation for full details)

## Distribution and documentation

`biblatex-software` is available on CTAN as  
<https://www.ctan.org/tex-archive/macros/latex/contrib/biblatex-contrib/biblatex-software>

- documentation in `software-biblatex.pdf`
- demo example in `sample-use-sty.pdf`
- sample bibliography in `biblio.bib`

## Development

contributions are welcome on  
<https://gitlab.inria.fr/gt-sw-citation/bibtex-sw-entry>

BibLaTeX users can finally properly handle software in their bibliographies.

*Let's spread the word!*

## Articles using biblatex-software and Software Heritage



R. Di Cosmo. “Archiving and referencing source code with Software Heritage”. In: *ICMS. Lecture Notes in Computer Science*. to appear, preprint available. 2020. URL: <https://hal.archives-ouvertes.fr/hal-02526083>.



R. Di Cosmo and M. Danelutto. “[Rp] Reproducing and replicating the OCamlP3l experiment”. *OCaml*. In: *ReScience C 6.1* (2020). DOI: [10.5281/zenodo.3763416](https://doi.org/10.5281/zenodo.3763416). URL: <https://zenodo.org/record/3763416/files/article.pdf>.