


# BIIGLE

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**i** BIIGLE is a web-based software for image and video annotation that enables collaborative research on large datasets. Annotation is the process of marking objects of interest (e.g. with points, circles, polygons) in images or videos and describing these objects with labels. BIIGLE offers tools for manual and computer-assisted annotation, quality control and the collaboration on custom taxonomies to describe objects. Annotated data can be published as a data product in the Semantic Layer of the RDC. BIIGLE is freely available and can be installed in cloud environments, a local computer or on mobile platforms during research expeditions. The public instance on [biigle.de](https://biigle.de) is integrated in the RDC and freely available for non-commercial use ([terms of use](#)).



## BIIGLE

Status: **PRODUCTIVE**

Weblink: [biigle.de](https://biigle.de)

Target group: owner and developer of data products

Keywords: labels, images, videos, annotation

RDC Integration: **connected**

Product owner: BIBI/Uni Bielefeld

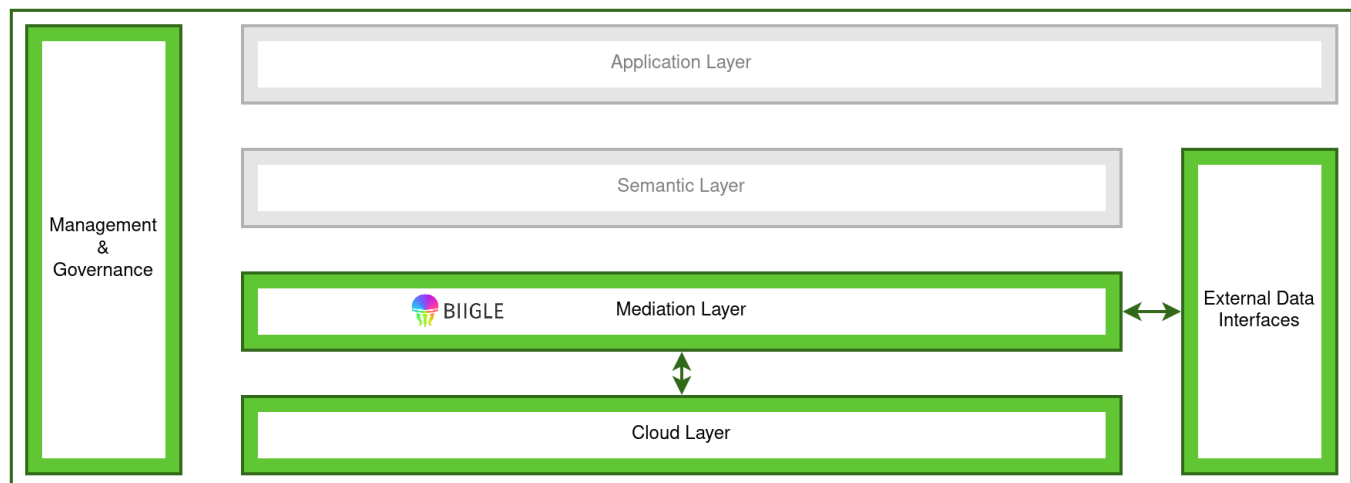
## Overview



The target user groups include (but are not limited to) biologists, ecologists, geologists or engineers who need to analyze large amounts of image or video data. BIIGLE provides a highly user-friendly graphical interface which does not require extensive learning to operate. Users just need to be experts in their scientific domain to identify the objects or regions in the imaging data. The software supports any image and video format that web browsers can display (and also large TIFF images). Annotations and image metadata can be exported in various (machine-readable) report files. BIIGLE also supports the emerging image and video (annotation) metadata standard [iFDO](#).

## RDC Integration

BIIGLE is a service that is used to transform imaging data into tabular annotation data and as such resides in the mediation layer of the RDC. It supports NFDI Login as an authentication method (RDC: Management & Governance). Also, users can annotate image and video data stored in the Aruna Object Storage (RDC: Cloud Layer). Finally, external data interfaces can be used to also provide imaging data or to import labels (e.g. from the WoRMS - World register of marine species database, <https://www.marinespecies.org>).








## Getting started

BIIGLE is available on [biigle.de](https://biigle.de). To get started, visit the website and create a user account. You can use NFDI Login to register with your existing credentials. Now follow the user guide below.

# User Guide

In a typical use case, a user creates a new BIIGLE account on [biigle.de](https://biigle.de). Once the account was confirmed by the administrators, the user can upload image and video files to BIIGLE, connect a cloud storage service such as the Aruna Object Storage or link the files from a self-managed web server. Using these files, the user can create an annotation project and in the project image or video collections (called "volumes") to organize the data. They can also create taxonomic lists (called "label trees") with labels that are used to describe objects or regions in the imaging data. Next, the user can use the image and video annotation tools to annotate their data. Finally, they can request a report file with a (machine-readable) summary of their annotations and image metadata. The report file can be used for further processing and analysis.

1.  Upload files
2.  Create a project
3.  Create or attach a label tree
4.  Create a volume
5.  Annotate
6.  Download a report

Detailed information on all BIIGLE features can be found in the user manual: <https://biigle.de/manual>

## Developer Guide

BIIGLE offers an HTTP API that can be used to interact with the application through custom scripts. The official API documentation of the main BIIGLE instance can be found here: <https://biigle.de/doc/api/index.html>

There is also a [repository of community-maintained scripts](#) that can serve as examples for how to implement custom solutions.

BIIGLE has a GPL-3.0 license and is developed openly at GitHub (<https://github.com/biigle>). Developers are encouraged to contribute to BIIGLE through bug reports, feature discussions or feature development. To get started, please have a look at the [contributing guide](#).

You can also set up your own BIIGLE instance. As a web application, BIIGLE usually runs on a central server which is accessed by users through a local network or the Internet. However, BIIGLE can also be installed and used locally on a single machine. The hardware requirements (for the basic configuration of BIIGLE) are quite low, it can even run on a small Raspberry Pi computer. More advanced features such as video object tracking or machine learning require more computing power or special GPU hardware. The software architecture of BIIGLE allows a flexible configuration (through several optional application modules) and a flexible deployment, from the Raspberry Pi to a distributed cloud setup.

A template for a self-hosted BIIGLE instance as well as installation instructions can be found at GitHub: <https://github.com/biigle/biigle>

## References

### Links:

- Main instance: <https://biigle.de>
- Code: <https://github.com/biigle>
- Support: [info@biigle.de](mailto:info@biigle.de)
- Community: <https://github.com/orgs/biigle/discussions>
- Newsletter: <https://biigle.de/newsletter>

### Publications:

- Langenkämper, D., Zurowietz, M., Schoening, T. and Nattkemper, T.W., 2017. Biigle 2.0-browsing and annotating large marine image collections. *Frontiers in Marine Science*, 4, p.83. <https://doi.org/10.3389/fmars.2017.00083>
- Zurowietz, Martin, Daniel Langenkämper, and Tim W. Nattkemper. "BIIGLE2Go—a scalable image annotation system for easy deployment on cruises." *OCEANS 2019-Marseille*. IEEE, 2019. <https://doi.org/10.1109/OCEANSE.2019.8867417>
- Zurowietz, M. and Nattkemper, T.W., 2021. Current trends and future directions of large scale image and video annotation: Observations from four years of BIIGLE 2.0. *Frontiers in Marine Science*, p.1752. <https://doi.org/10.3389/fmars.2021.760036>