

# Software for the analysis of traffic route quality and usage

Cyface using Cloud&Heat's Infrastructure as a Service based on SecuStack

## About Cyface

Reducing CO<sub>2</sub>-emissions in cities has become more important than ever, which is why bicycles and associated traffic routes are at the forefront of work and research at Cyface. Cyface not only focuses on climate protection, but also promoting citizens' health. To accompany this change, the collection and evaluation of cycle path road and traffic data are essential. Together with a strong network of engineering service providers, science and industry experts, Cyface carries out projects in which they enable flexible data acquisition and create meaningful analyses of traffic routes.

## The Cyface App

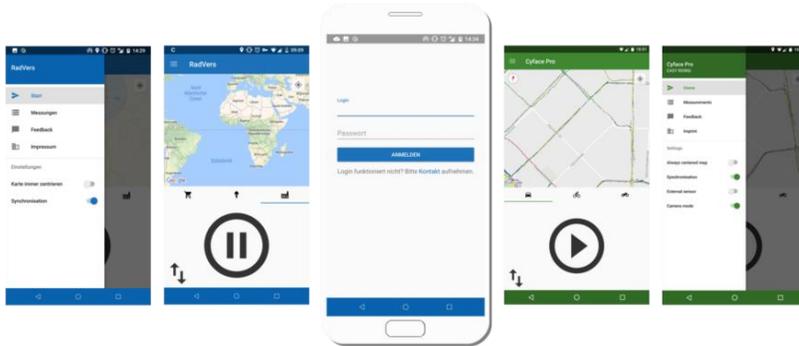
The Cyface app is a tool for metrological bike riding on streets, cycle paths or sidewalks. During the bike ride, the sensors built into the smartphone record movement and vibration data. With the help of an accelerometer, gyroscope and satellite supported position detection, a wide range of data can be collected. Vibrations are recorded autonomously, while riding a bike or driving a car (sampling rate of 50–200 Hz), and subsequently saved and transferred to a predefined server once connected via Wi-Fi. Using a position signal and time stamp, the bike ride and street profile can be recorded exactly. The more people using the app, the more data captured and hazards detected.

The road quality is examined for vibrations of one centimeter or more and subsequently classified and displayed on the website using a four-point scale based on the international roughness index (IRI). Blue = very good; green = good; yellow = moderate; red = bad.



With the white label app, the user can change the Cyface app according to their individual ideas and preferences in their projects. Design, buttons, and functions can also be adapted for each project, giving the user an application tailored to their needs.

With Open Source, there is a crowdsourcing-approach, which makes it possible for citizens, building authorities and partner companies to use the software to record position and vibration data while riding a bicycle, car or motorcycle. This reduces the costs of recording road conditions and the need for expensive inspection drives.



## Current projects

**RadVerS** with the TU Dresden.

Collection of behavioral data on the road using smartphones and differentiation of various cyclist groups.

**Movebis** with Klima Bündnis e.V. and the TU Dresden.

Research project for the optimization of traffic conditions using scalable cloud resources for improved cycling conditions.

**BikeSim** with the TU Dresden.

Simulation of bicycle traffic system capacity and route selection to forecast the utilization of traffic infrastructure and usage of big data.

**DatEnKoSt** with AWS-Institut Saarbrücken.

Development of a road management application with the help of valid status detection via smartphones and AI-based condition forecasting.

**Vicenza**

Evaluation of the traffic volume on the local cycle paths for a better overview in cooperation with NET, which process the data.

## Cyface using Cloud&Heat's technology

For their project, Cyface was looking for a German provider able to guarantee data protection and they found the perfect partner in Cloud&Heat! Cyface is using our Infrastructure as a Service based on SecuStack and the data is hosted in our ISO/IEC 27001 certified data center in the Eurotheum in Frankfurt. Cyface is using a safety hardened cloud operating system based on SecuStack for city cycling. This ensures secure and encrypted access to the public cloud infrastructure, whilst allowing an isolated and encrypted mandate network. Currently the used instance is a 8v CPU with 32 GB RAM and 500 GB SSD.

## Outlook

With Cyface's upcoming projects, there will be more capacities needed, which we are happy to provide. For increasing the growth and the degree of automation that comes with that, we can provide our Managed Kubernetes service to relieve the administration. Future projects in the EU, can make it possible to combine and extend our various partnerships and provide the necessary infrastructure on site e.g. in Sweden.