Open-source data logger for environmental data collection

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City Regions and Businesses boosting Nature Positivity (KYLKI) is a collaborative project of the city of Vantaa, Metropolia UAS, Laurea UAS, and the Finnish Environment Institute. The project members are working together to support the transition of businesses and cities in the metropolitan area towards nature-positive practices. The project aims to promote solutions that foster sustainable business, environmental responsibility, and help cities achieve their biodiversity goals.

It aims to establish a network, develop methods and tools for assessing and reducing the environmental impacts of businesses and cities, and test new innovations in urban settings. Through activities such as data collection, co-creation within an RDI framework, and pilot projects, the project will create opportunities for business innovation, strengthen the competitiveness of small and medium-sized enterprises (SMEs), and promote the development of environmentally responsible markets.

One of the work packages in the project deals with collecting environmental data to assess functionality of rain gardens built for managing stormwater runoff. There are lots of sensor and data loggers available from different manufacturers. Typically, data loggers are configurable to support sensors with compatible electrical interface, but the loggers are tied to the manufacturer's cloud infrastructure which limits the applicability of the data or adds complexity to the data collection. To address these issues an open-source data logger was developed using publish-subscribe model. Transport layer and data encoding are separated from data collection letting user to choose both data encoding and cloud endpoint freely. The design even allows user to run multiple cloud senders to pass the data to multiple clients without adding an intermediate transport agent.