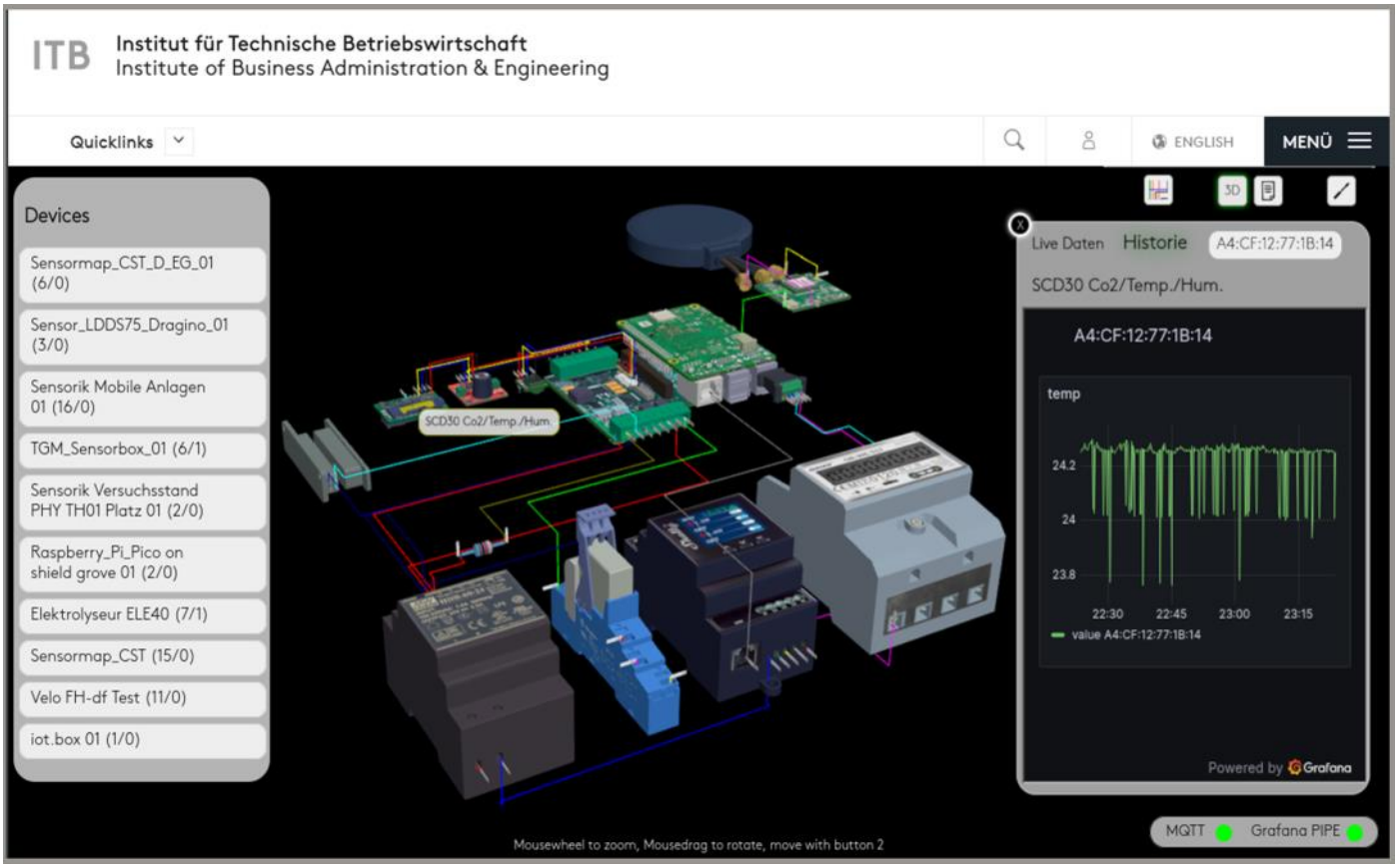
Easily create and organise digital twins with Twinjago

Small and medium-sized enterprises (SME's) have so far hardly been able to benefit from the opportunities and initiatives of 'Industry 4.0'. The applications and the required infrastructure are too large, too complex and too risky. Innovative open-source developments can help here. With a new type of platform with a user-friendly front end, Münster University of Applied Sciences offers a flexible and low-cost yet powerful tool for mapping, integrating and controlling digital twins.

An article of the Institute for Technical Business Administration (ITB)



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Digital twins open up many opportunities for companies to document, organise and control technical assets. However, access to this technology has so far been associated with risks for SMEs.

Digital twins can be used to store and organise physical objects in a spatially decoupled manner from the real world, i.e. virtually. If neighbouring data streams are linked to the interfaces of this virtual model, a dynamic image is even created, a so-called 'Enriched Digital Twin (EDT)'.

In addition to simplifying access to the object itself, it promotes a deep understanding of the company's data world among users. And it does so without the skills typically required by data scientists or similar experts.

There are already numerous tools for this type of system design, e.g. MindSphere (Siemens), Azure Digital Twins (Microsoft) or ThingWorx (PTC). Regardless of whether the applications come from technology groups, IT platform providers or independent software companies, they lead to high costs, require user training and create long-term dependencies (‘lock ins’). This makes these systems unsuitable for small and medium-sized enterprises (SMEs).

This problem was recognised at the Institute of Technical Business Administration (ITB) at Münster University of Applied Sciences. With Twinjago, a low-threshold open-source platform for EDTs was developed that explicitly gives SMEs access to this technology.

Twinjago is an intuitive tool for visualising physical objects of all kinds as well as incoming and outgoing data streams. It includes an online configurator for creating interactive 3D views, bitmap labelling, accompanying digital documentation and descriptive tooltips and data paths (‘routings’).

This means that the programme package essentially comprises the same functionalities as existing systems on the market. However, Twinjago is also characterised by the following special features.

1. Thanks to the intuitive user interface and the deliberately reduced range of functions, anyone with browser experience can easily generate a 3D image in a short time.
2. By reducing image data and using a simple 3D framework, a previously unknown performance of the virtual model is achieved. Successes are quickly visible.
3. The data sources from the IoT infrastructure (Internet of Things) relate to just a few clicks. The data flows are visualised in real time.
4. It can be used regardless of the sector and area of application.
5. The objects can be embedded in supersystems without size restrictions. This makes it possible to zoom in and out of the overall system (e.g. sensor module ↔ sensor ↔ sensor map ↔ system ↔ building).
6. The platform was developed exclusively with open-source components. This increases the flexibility of use and, above all, avoids lock-in effects.

Twinjago has already exceeded the status of minimum viable product (MVP). Further use cases should help to achieve market maturity.

Various use cases in the laboratory and in practical, operational applications clearly demonstrate the benefits of the tool. Twinjago is to be further developed with other partners from the SME sector and brought to market maturity. The platform is also suitable for use in teaching and further education.

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