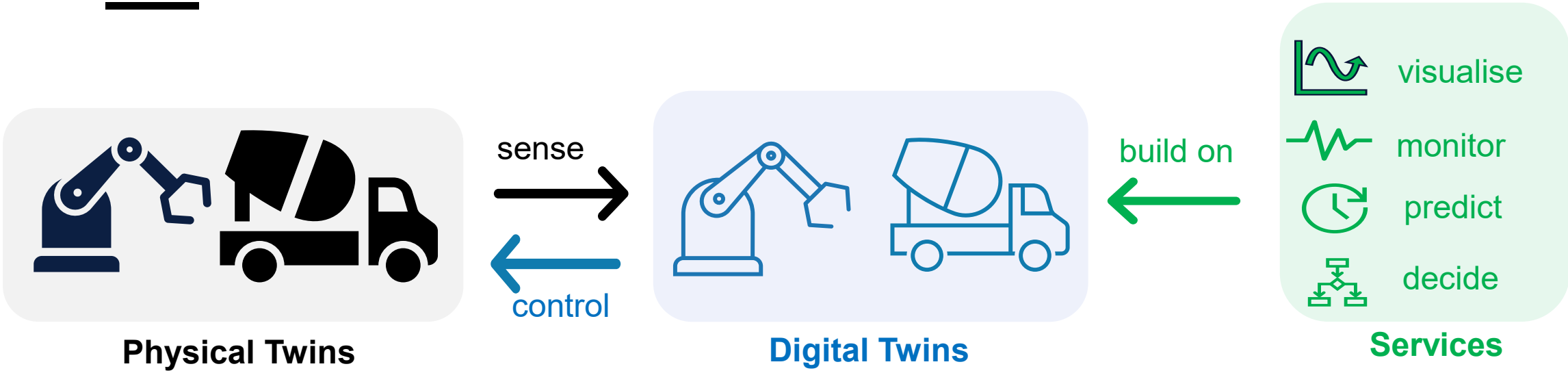
DTaaS

Digital Twin as a Service Software Platform

Prasad Talasila

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What is a Digital Twin?

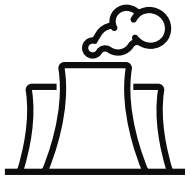


- ✓ Digital representation of a real-world entity which we call the physical twin.
- ✓ Connected in real-time with physical twin.
- ✓ Offers its stakeholders a range of services

What are the Application Domains?



Water Systems



Air Pollution



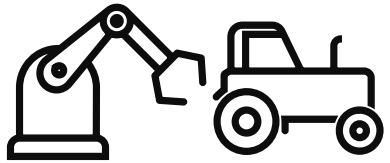
Cities



Lifestyle Interventions



Oceans



Industry 5.0



Transportation



Personalized Medicine

Digital Twin as a Service

What is DTaaS ?

It is a platform to:

Create, Use, and Share Digital Twins

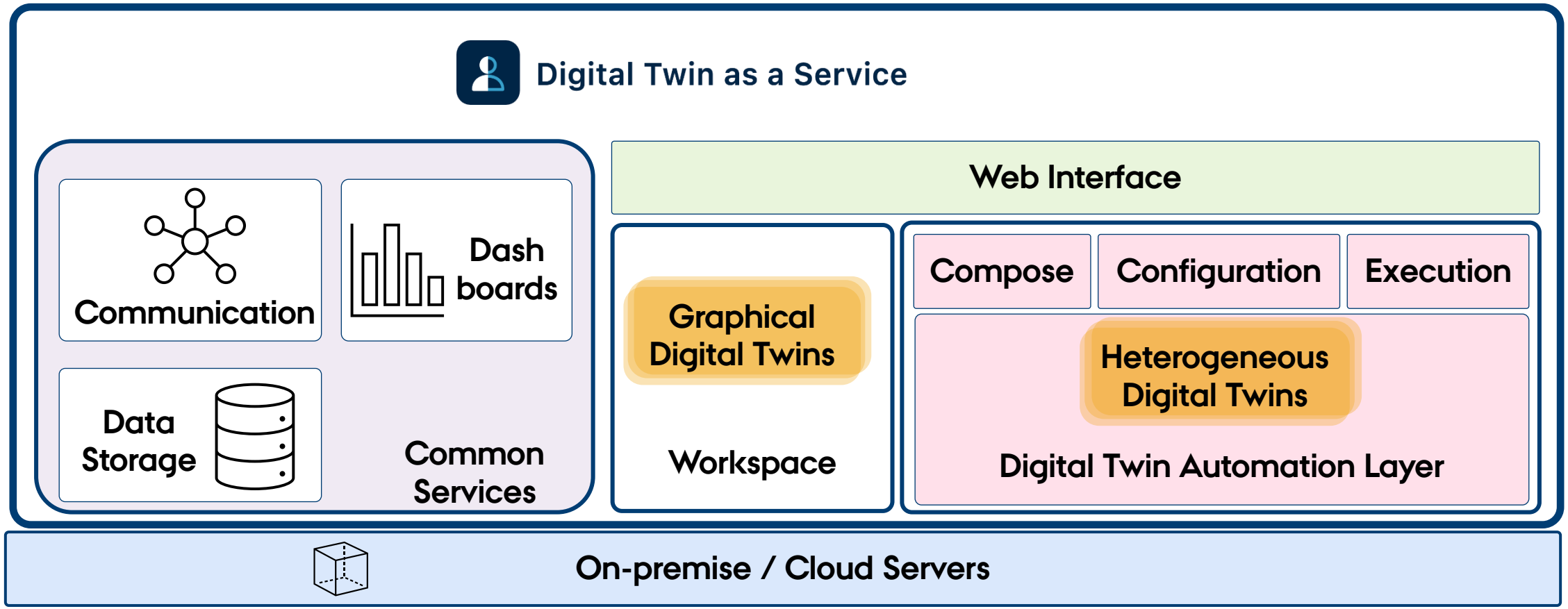
Support Digital Twins from Many Engineering Domains

Provides private workspaces

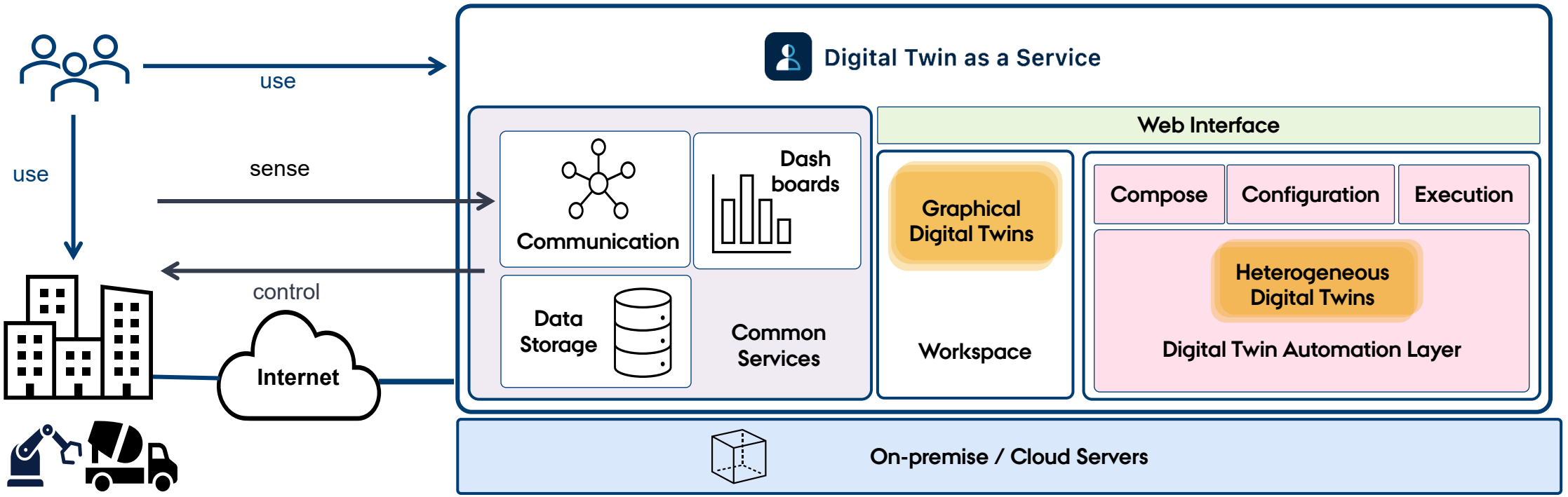
Run Digital Twins as Services

Scalable execution of Digital Twins

A User Centric View of DTaaS



A User Centric View of DTaaS



DTaaS Platform Components

- **Common services** - Communication, Databases, visualization services
- **Workspace** - Virtual desktop environment for collaboration
- **DT automation layer (DTAL)** - select assets and configuration, Git based storing of assets

USER CENTRIC VIEW OF DTAAS

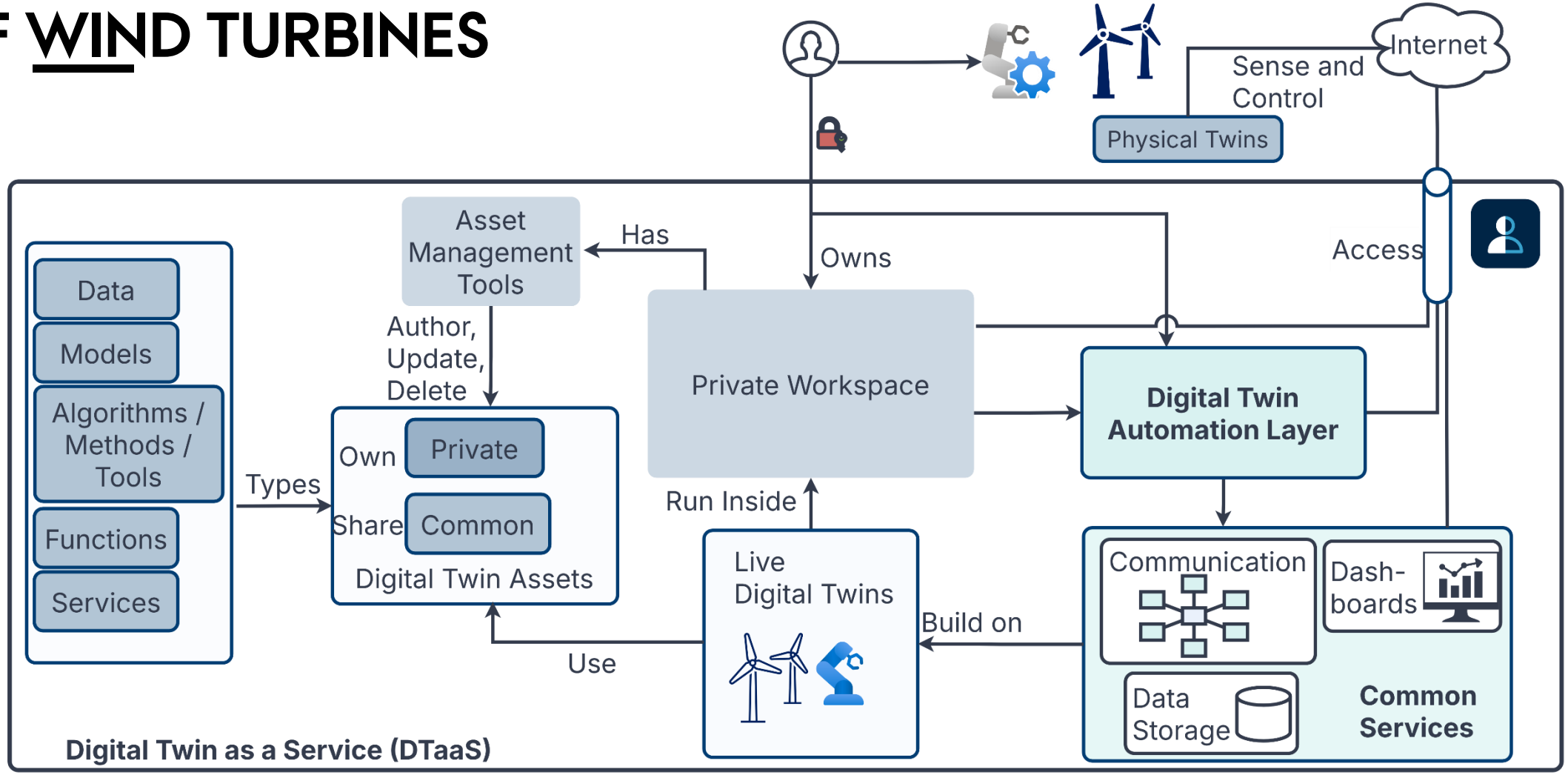
DTaaS

You can use it as:

- ✓ A private workspace (containerised Linux desktop) to create digital twin assets and digital twins
- ✓ A workspace to develop different kinds of digital twins (electrical, mechanical, wind energy)
- ✓ Communication platform for real-time data exchange between physical and digital twins
- ✓ Data storage and dashboard service
- ✓ Automation digital twin execution platform using DevOps (Development Operations)
- ✓ Complementary platform to other digital twin platforms

USE CASE: STRUCTURAL HEALTH MONITORING OF WIND TURBINES

DTaaS

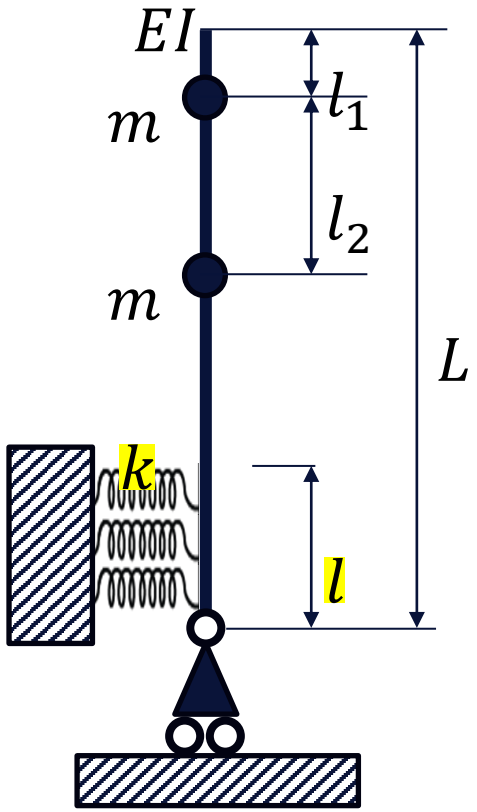


Ref: Adapted from Prasad Talasila, Dmitri Tcherniak, Anders M.D. Jensen, Swarup Mahato, Jakob V. Medom, Martin D. Ulriksen, Giuseppe Abbiati, A. Schörghofer-Queiroz, Peter G. Larsen, Lars Damkilde, A digital twin platform for structural health monitoring, Computer-Aided Civil and Infrastructure Engineering, Volume 50, 2026.

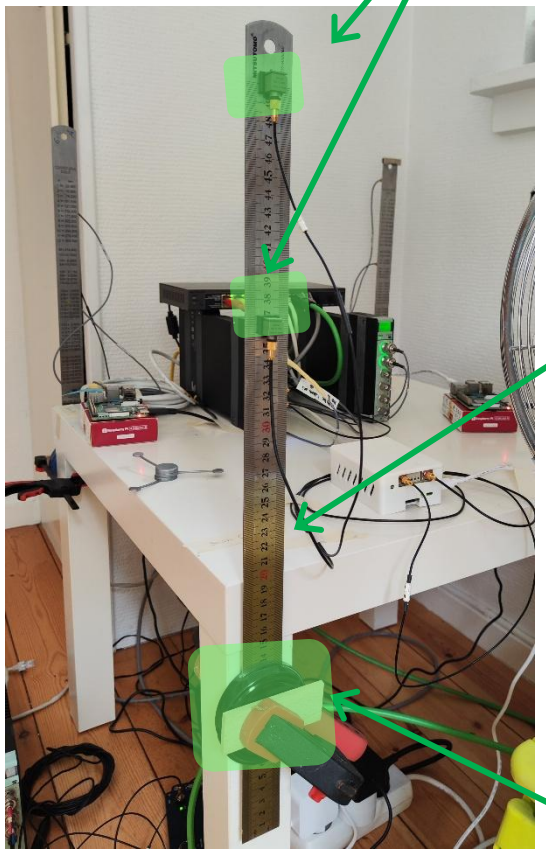
Use Case: Structural Health Monitoring of Wind Turbines (Lab Demonstration)



Actual Turbine in North Sea

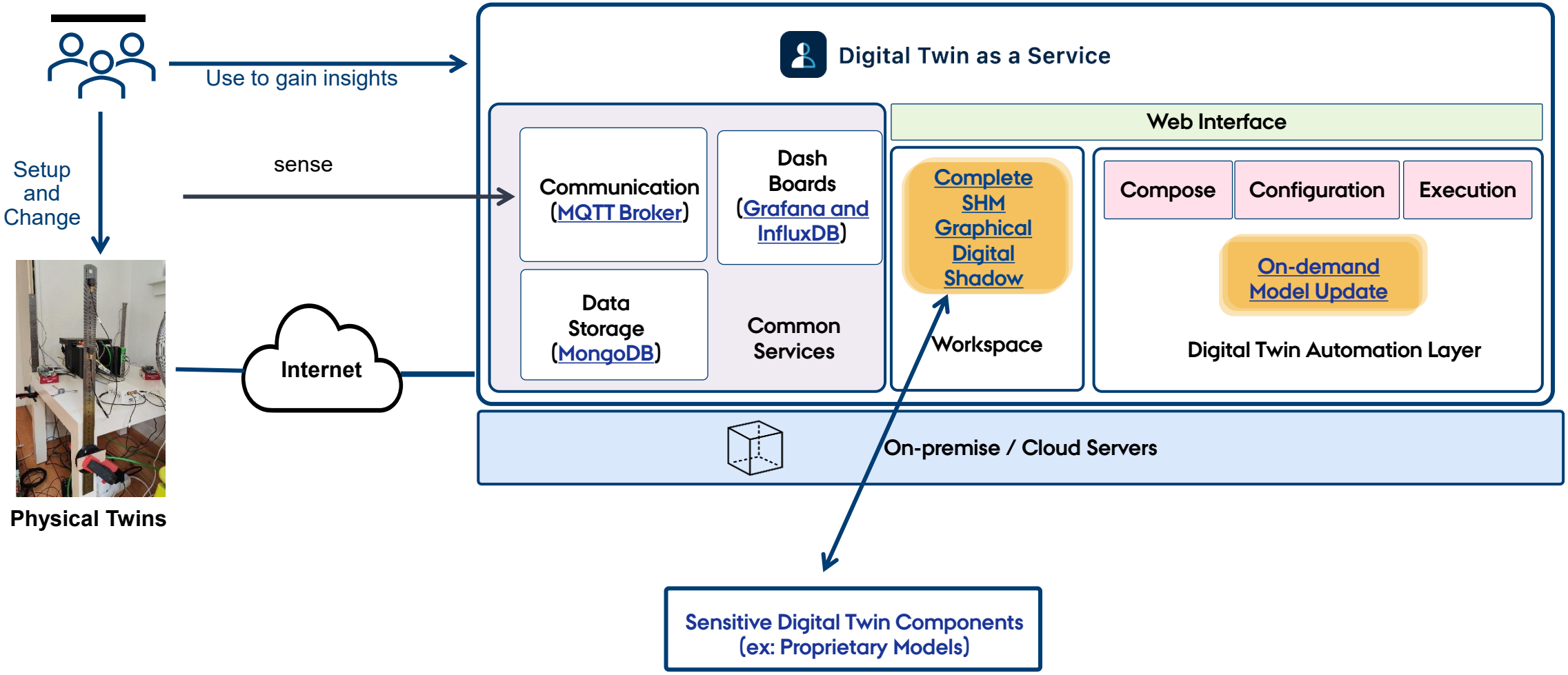


Mathematical Model

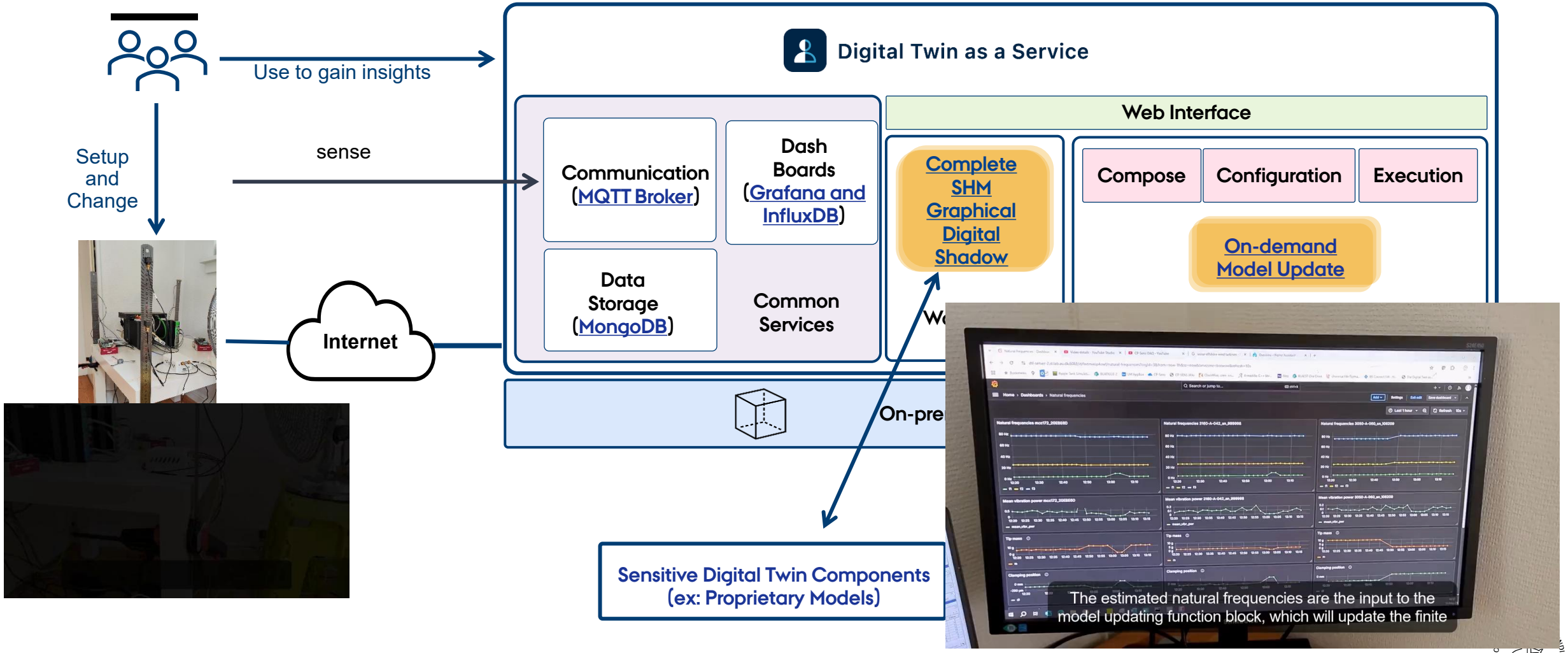


Lab Setup

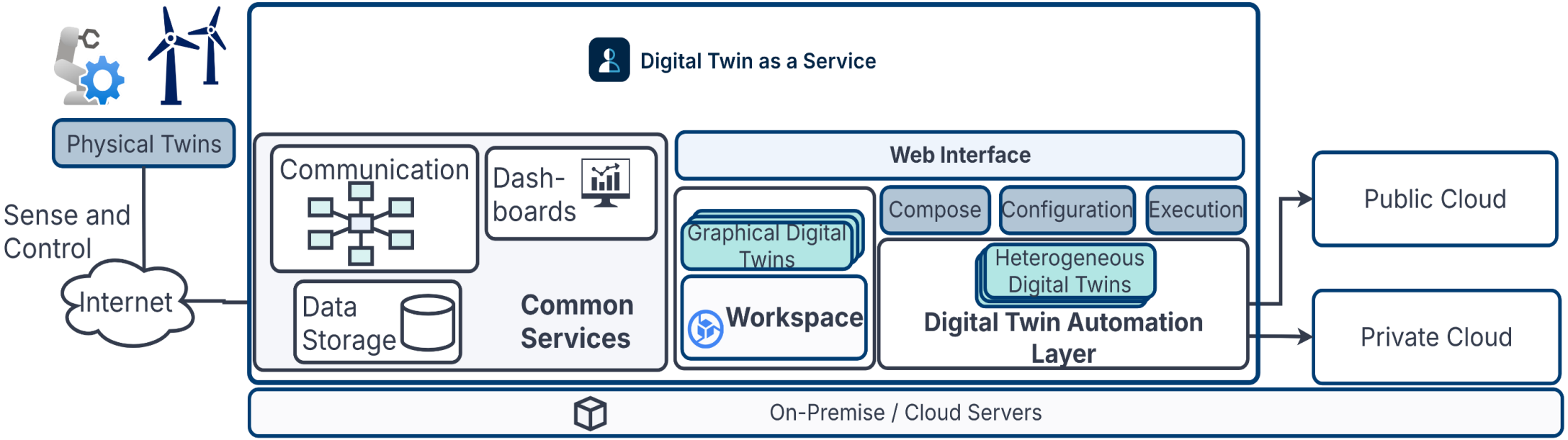
Use of DTaaS in Demonstration for Demonstrating SHM Digital Shadow



Use of DTaaS in Demonstration for Demonstrating SHM Digital Shadow

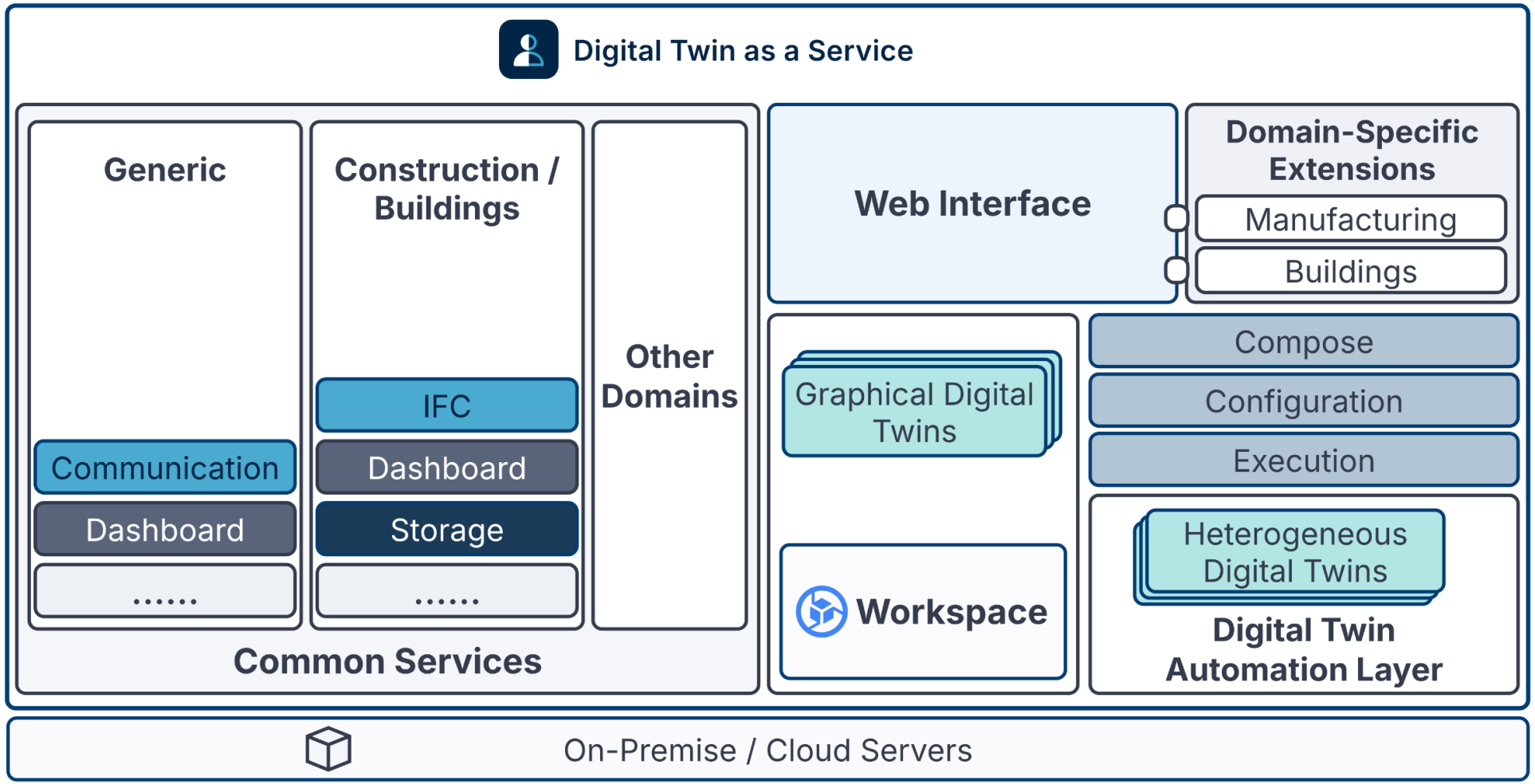


Automation Layer on Digital Twin as a Service Platform



Automation layer can run digital twins and simulations in two modes: continuous (long-running services) and one-off (batch jobs).

ADDING CROSS-DOMAIN DT SUPPORT IN DTAAS



Support for Cross-domain DTs

- Keep the common base: storage, communication and generic services
- Build domain-specific layers on top of it (DTs and / or services)
  - Buildings page, shipped: IFC models from your library, coloured by live sensor readings (bim-kit)
  - GIS and maps for city twins, planned
  - Annotated CAD models with live sensor updates, planned
- Load domain layers as plugins: extension SDK (dtaas-sdk) is under review, not yet merged

DOMAIN-SPECIFIC DIGITAL TWINS (STRUCTURED WORKFLOWS)

Buildings



Autodesk Revit + Tandem (accessed: 3-12-2025)
Twin Builder

Virtual Commission



Simulation Demo (accessed: 3-12-2025)
fe.screen SIMC

Heart



Digital Twin of the Heart (accessed: 3-12-2025)
Simon Healthineers



Samsara IoT Platform Demo (accessed: 3-12-2025)
Fleet Management

? What if you want to do something else?

DTaaS supports

- **unstructured cross-domain applications**
- **Structured workflows for building monitoring (experimental release)**

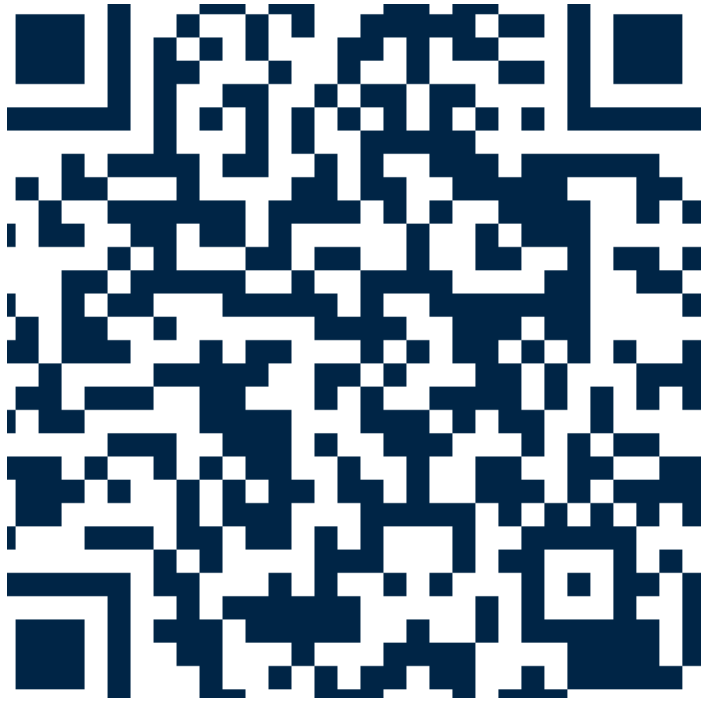
AARHUS UNIVERSITY
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

PRASAD TALASILA
SOFTWARE ENGINEERING AND COMPUTING SYSTEMS

HOW TO GET IT?

Use existing installation:

prasad.talasila@ece.au.dk



Documentation home

into-cps-association.github.io/DTaaS/

Try it

`pip install dtaas` → `dtaas deployment generate --type localhost` single-user, HTTP, about 10 minutes. Platform services (InfluxDB, Grafana, RabbitMQ, MQTT, MongoDB, PostgreSQL, ThingsBoard): `pip install dtaas-services`

Docs: Admin → Installation → DTaaS CLI and Platform Services CLI

See it

v1.0 feature walkthrough (26 April 2026), plus the localhost and secure-server installation walkthroughs. Docs → Media Playlist

Read it

Talasila et al., “Composable digital twins on Digital Twin as a Service platform”, Simulation 101(3), 2025. doi.org/10.1177/00375497241298653